MEDICAL DECISION MAKING AMONG THE KOM OF CAMEROON: MODELING HOW CHARACTERISTICS OF ILLNESSES, PATIENTS, CARETAKERS, AND COMPOUNDS AFFECT TREATMENT CHOICE IN A RURAL COMMUNITY

By

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Gery Wayne Ryan

To my family – Sal, Tiger, Sara, Terry, and John – for always being there to make me smile.

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Abstract of Dissertation Presented to the Graduate School
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MEDICAL DECISION MAKING AMONG THE KOM OF CAMEROON: MODELING HOW CHARACTERISTICS OF ILLNESSES, PATIENTS, CARETAKERS, AND COMPOUNDS AFFECT TREATMENT CHOICE IN A RURAL COMMUNITY

By

Gery Wayne Ryan

December 1995

Chairperson: Dr. H. Russell Bernard
Major Department: Anthropology

Laypeople in Wombong, a small, Kom-speaking village in the North West Province of Cameroon, consider seven treatment modalities when managing illnesses. Modalities include waiting, using various home remedies or pharmaceuticals, going to a government clinic or a Catholic hospital, and consulting a private nurse or a traditional healer. A determinant approach is used to explore how characteristics of illness episodes, patients, caretakers, and compounds may account for variations in laypeople's treatment behavior. Separate multivariate models are constructed to predict the use of six of the treatment practices.

Data came from a randomly selected sample of 120 compounds in the community. Multiple ethnographic interviews and structured surveys were conducted with 384 individuals, including a detailed survey of 454 acute illnesses that occurred in 88 compounds over a five-month period. The latter survey corroborate previous findings that 80% of illnesses are treated within the household.

No single variable, nor class of determinants, played a dominant role in explaining all types of treatment behavior. As a general rule, characteristics of illnesses were better predictors of treatments administered in the home, while characteristics of the caretaker and compound were better predictors of behavior administer outside the compound. Characteristics of the patient failed to predict any of the treatments in the multivariate models.

Caretakers recognized many illness signs and symptoms, but only a few of these characteristics predicted treatment choices. Among the characteristics of illnesses--signs, diagnosis, measures of severity, and attributions of causality--the latter were the least predictive of behavior. Of those illness characteristics that did predict behavior, the characteristics were equally likely to help people decide what not to do as they were to help people decide what to do.

Caretakers' beliefs and attitudes about treatments were not particularly predictive of treatment behavior. Neither knowledge of home remedies nor healers helped predict the respective use of either of these treatment modalities. Wealthy compounds were more likely to seek immediate care and were more likely to use Western medical professionals than were poorer compounds. Wealth did not affect the use of traditional healers.

CHAPTER 1
INTRODUCTION

My dissertation research in Cameroon is the continuation of work I did in Mexico for a master's degree. In the summer of 1989, I went to Mexico to examine how mothers decided to treat childhood diarrhea. After conducting 20 ethnographic interviews, Dr. Homero Martínez and I built an ethnographic decision model (EDM) to predict when mothers (in the aggregate) would give their children teas, carbonated beverages, rice water, sugar-salt-solutions (SSS), or pills, or would use physical manipulations or western medical personnel. The model contained emic criteria (elicited directly from informants) and etic criteria (based on illness signs and the availability of treatment options). We tested the model on an independent sample and found that the model predicted 85% of the treatment behaviors reported by mothers.

In building and testing our model, we found several things:

1) Certain physical symptoms led directly to particular treatments while other symptoms were more ambiguous and led to more than one possible response.

2) Certain conditions prevent use of certain remedies. These are *constraints* on the use of a particular remedy. For example, mothers need to know how to mix SSS and they need to know the name of a particular pharmaceutical product before they can use (or select) these options.

3) The order in which women administer treatments depended on two factors: their faith in the treatment's efficacy and their understanding of the treatment's function. In other words, individual perceptions of treatment efficacy influence which treatments women used first, second and third.

4) Women varied in their hierarchy of treatment preferences, and whether they considered specific treatments to have curing or simply palliating functions.

Despite such clear and powerful results (that 85% prediction rate on an independent sample), my study in Mexico was limited. Four months was enough to explore laypeople's beliefs for only a single illness.

Home Case Management in Cameroon

In January of 1991, I went to Cameroon to begin an 18-month study of how laypeople in Wombong, a Kom-speaking village in the North West Province, dealt with all types of acute illnesses. During this time, I coordinated a six-person research team. We conducted both exploratory and confirmatory research. We asked questions, formulated hypotheses, and tested ideas as part of an iterative data collection and analysis process.

In all, we used 20 different surveys and six different kinds of ethnographic interviews to collect data on: a) the local medical, social, and political environment, b) the socio-economics and demographics of sample compounds, and c) the medical knowledge, treatment practices and social networks of individuals. Some data came from informant recall or opinion, while other data came from unobtrusive measures or from outside sources. We interviewed 384 individuals in a sample of 120 compounds. In the centerpiece of data collection, we recorded the home case management practices for 454 acute illnesses that occurred in 88 compounds over a five-month period.

Unlike the Mexican study, the data from Cameroon allows me to examine the general question: *What accounts for laypeople's home case management (HCM) behavior?* The question directs my analysis toward particular issues and away from others.

First, the primary goal of this analysis is to explain the variance in people's behavior. In particular, I consider seven treatment modalities used by laypeople in Wombong: waiting, using various home remedies or pharmaceuticals, going to a government clinic or a Catholic hospital, and consulting a private nurse or a traditional healer. I examine the factors that affect: a) whether laypeople use each treatment, b) the order in which the treatments are used, and c) the number of modalities used during a single episode. I examine people's beliefs only when these beliefs may affect people's health-care practices, or when I need to provide the cultural context in which people make medical decisions.

Second, this analysis describes and explains the variation of HCM practices within a single community. I examine the HCM practices from a representative sample of compounds in Wombong and explore how characteristics of illness episodes, patients, caretakers, and compounds may account for variations in treatment behaviors. I do not consider seasonality, costs of treatments, or qualities of health services because they are relatively constant across the study compounds.

In order to understand HCM practices, I need to place behaviors in the context of a larger pluralistic medical system. A *medical system* refers to the interaction among medical sectors (people); medical traditions (beliefs and practices); and social, economic

and environmental factors that affect sectors and traditions in a particular community or region.

Figure 1–1 provides a graphical depiction of a medical system. *Medical traditions* are distinctive combinations of ideas, practices, skills, and technologies related to health care in a society. For instance, medical traditions in Africa may include biomedicine, Christian healing, Muslim healing, herbal healing, sorcery and divination. Medical traditions are cultural artifacts created by people over time.

Although medical traditions may be coherent bodies of knowledge, all members of a community may not share this knowledge (Young, J. and Garro 1982; Garro 1986). It is an empirical question as to how much people agree with one another about medical beliefs--a question that I explore in Chapter VI.

Medical sectors are segments of the community (i.e., groups of people) associated with a particular medical tradition (Kleinman 1980). The distinction between medical traditions and medical sectors is important. Medical traditions comprise related beliefs and behaviors; medical sectors comprise groups of people. Some segments of a community have stronger association with particular medical traditions than others. For example, specialists are more closely associated with a particular medical tradition than are nonspecialists.

We can further distinguish specialists based on their degree of social organization. Kleinman (1980) suggests that *professionals* are members of an organized group of practitioners while *folk* healers are independent of formal group structures. I find these distinctions useful and divide communities into three sectors: the popular sector

(laypeople), professional healers (organized practitioners), and folk or traditional healers (loosely organized practitioners).

Throughout this dissertation, I will use the term *practitioner* to refer to health-care specialists and *layperson* to refer to nonspecialists. Since Western biomedical practitioners are the only organized practitioners working in Kom, I use the term *professionals* to refer to western biomedical health-care specialists and the term *healer* to refer to refer to folk or traditional healers. This dissertation concentrates on understanding how laypeople rather than professionals react to illnesses.

In some cases, a single medical tradition will dominate a medical system. In *pluralistic medical systems*, however, multiple medical traditions coexist. It is widely recognized that most medical systems are pluralistic, particularly those found in Africa. In any given village, health care specialists may include an African physician, a dispensary aide, a Christian prophet, spirit possession mediums, specialists in sorcery, diviners of all kinds, herbalists and faith healers (Feierman 1985). In urban centers, the diversity in types of healers is staggering.

Studies of African medical systems show that laypeople move back and forth between hospitals and healers of one type and another (Janzen 1978a; Janzen and Feierman 1979; Janzen and Prins 1981). Good (1980) found that people frequently consult healers across ethnic and social class lines. Chavunduka (1978) found that education and income did not correlate with hospital care.

In a medical system, laypeople are the primary caregivers. Research from around the world also shows that most health behaviors occur in the home (Kroeger 1983a;

Mwabu 1986; Snow et al. 1992), and many of those behaviors that occur outside the home are managed by household members (Janzen 1978b). Most illnesses that occur in the world are managed by laypeople who have little or no professional medical training (Kleinman 1980).

Home case management includes treatment behaviors that occur inside the home and careseeking behaviors of household members looking for outside assistance. *Inside-HCM* practices include home remedies, administration of pharmaceuticals, and dietary changes. *Care-seeking* behaviors occur when household members search for and select among the health providers available outside the home. Researchers have been most interested in care-seeking behaviors. [See Stoeckle et al. (1963), Mechanic (1969), Colson (1971), McKinlay (1972), A. Young (1976), Foster (1977), Fabrega and Manning (1979), and Kroeger (1983a, b) for reviews.]

Much of this research on care seeking is about the use of biomedical practitioners and facilities both in industrialized and developing nations. Some studies focus on a single care-seeking behavior (usually the use of Western biomedical treatments), while others examine how people seek assistance from a multiple providers in a pluralistic system (Janzen 1978b; Young, J. 1980; Mathews and Hill 1990; Ryan and Martínez in press).

Not to be forgotten in HCM is the antithesis of health action: that of delay or no action. Caretakers may wait for several days or take no action at all when confronted with illness.

Most of our knowledge of the determinants of HCM comes from studies of single care-seeking behaviors. Studies of *dual use* or *doctor shopping* are usually descriptive and only speculate about behavioral determinants (Janzen 1978b; Hamnett and Connell 1981), although there are exceptions (Saunders 1954; Press 1969; Pachter et al. 1992). Likewise, most studies are only concerned with which outside options people select, and few studies consider the order or *hierarchy of resort* (Schwartz 1969) in which people select the options. There are, however, some notable exceptions (Young, J. 1981; Mathews and Hill 1990; Ryan and Martínez in press).

The village of Wombong offers an excellent opportunity to study laypeople's HCM practices within a pluralistic medical system. Laypeople have access to western biomedical treatments in the form of pharmaceutical products, a government clinic, a private nurse, and a Catholic hospital. They also have access to traditional Kom medicine in the form of home remedies and folk healers. As is typical in most pluralistic systems, laypeople move back and forth between traditions looking for ways to stop illnesses. The question with which I went to Kom and that is the core of this dissertation is: what factors best account for variations in people's treatment choices in such a setting?

Frameworks for Explaining Home Case Management

Researchers in medical anthropology have used five general frameworks or models to explain health care behavior. These are: *determinant models, process models, mental models, critical models,* and *system models.* Together, these models provide overlapping, sometimes contradictory, explanations for similar phenomena. Each model

offers some insight into HCM behaviors, but none of them alone is adequate for explaining sequential data.

Of the five approaches, I find the determinant approach to be the most useful for explaining the Kom data. The determinant model accounts for intra- and intercultural variation in behaviors by examining how the characteristics of illnesses, patients, caretakers, households, communities, and health care services affect treatment behaviors. Since the 1950's, researchers have applied the determinant model to explain lay people's use of health facilities in developed and developing countries. By the mid-1980s, investigators had identified many of the factors that affect health actions (Stoeckle et al. 1963; Mechanic 1969; Colson 1971; McKinlay 1972; Young, A. 1976; Foster 1977; Fabrega and Manning 1979; Kroeger 1983a). Although earlier studies incorporated only socio-demographic variables, later studies also considered laypeople's beliefs and knowledge about illnesses and treatments (Rosenstock 1974a, b; Janz and Becker 1984).

The determinant approach, however, has been justly criticized for ignoring several important variables, for being atheoretical, and for not providing a mechanism by which determinants account for behavioral practices.

Over twenty years ago, McKinlay, noted that in the determinant approach:

> attention is seldom given to *how* specific individuals and groups made a particular decision, *what* factors or *which* individuals are influential in making this decision, or *why* one form of behavior is preferred to another. Any further research concerning relationships between rates of utilization and various attributes of social status--such as occupation, income level, education, and residential location--could add very little to what is already known in this regard. New theoretical insights and research strategies are needed, which will enable researchers to determine some of the influential intervening mechanisms between these crude socio-demographic variables and the specific behavior under examination (1972:11).

As part of my dissertation, I broaden the scope of the determinant framework. I consider important determinants used by other models. I outline a set of explicit guidelines for prioritizing which determinants should be considered first in explanations of home case management practices. And I propose a set of mechanisms by which determinants affect behaviors.

Some researchers suggest that a process approach provides insights into the mechanism by which determinants affect behaviors (Stoeckle et al. 1963; McKinlay 1972; Zola 1973; Young, J. 1981; Carroll and Johnson 1990). Unlike the standard determinant approach that looks at the use or nonuse of a single medical option, the process approach examines health behavior as a series of illness management stages (Freidson 1959, 1961; Polgar 1963; Suchman 1965; Zola 1973; Geertsen et al. 1975; Chrisman 1977; Igun 1979; Abelson and Levi 1985). These stages typically include illness recognition, diagnosis, consideration of alternatives, selection of alternatives, and evaluation of treatment outcomes. The process model suggests that different determinants affect each stage, ultimately creating a net effect on behavioral outcomes. I incorporate laypeople's' diagnosis of illness episodes, as well as their assessment of illness severity into the determinant framework.

I also borrow from system models of health behavior. System models attribute individuals' health practices to social forces and dynamics (Janzen 1978a; Young, A. 1981, 1982; Feierman 1985, 1986). In other words, illnesses are not randomly distributed throughout society. Instead, social forces determine who gets what sickness and who has access to what treatments (Young, A. 1975; Frankenberg and Leeson 1976; Nichter 1978;

Hamnett and Connell 1981). The same social forces (i.e., differential access to practitioners and interventions) determine how people define sicknesses in a community.

System models also view social networks as an important mechanism by which individuals move between medical traditions (McKinlay 1970, 1973). I consider the size and composition of individuals' social networks, and their social position in the community to be key determinants in HCM. The choices people make about their HCM practices occur within a political and economic environment, as well as within a cultural milieu. So far as the environment and medical culture vary, these too need to be included in the determinant framework.

I also incorporate insights from mental and critical models into my description of the medical system in Wombong. Mental and critical models in medical anthropology are primarily concerned with explaining people's thoughts and beliefs about illnesses at the individual and aggregate levels. Mental models describe individuals' beliefs about illnesses and treatments (Good, B. 1977; Kleinman 1980). The core concept is Kleinman's *explanatory model of illness* (EM). An EM is a set of beliefs about the etiology and onset of symptoms, the pathophysiology, and severity of illness, and the type of sick role and treatment of illness (Kleinman 1978). Investigators in this research tradition see EMs as emic explanations of behavior that give meaning to any sickness and guide action.

While mental variables are important in understanding illness, the method used by EM researchers to test the role of mental variables are suspect. Most EM research is based on ethnographic data from a small sample of informants. Investigators may be

tempted to use individual EMs to describe entire cultures without paying adequate attention to intracultural variation. Nevertheless, it seems apparent that people' beliefs are in someway related to their behaviors, so I incorporate some mental variables in my analysis. I leave for future research the task of understanding how this relation operates (i.e., whether beliefs cause behavior or vice versa).

Critical models offer yet another perspective. Not only do aggregate health beliefs affect health behaviors, but these beliefs are seen as the outcome of political and economic circumstances (Baer et al. 1986; Singer 1986, 1990, 1995; Morgan 1987; Scheder 1988). As Singer (1995) states:

> This effort is peculiarly anthropological in the sense that it is holistic, historical, and immediately concerned with on-the-ground features of social life, social relationships, and social knowledge, as well as with culturally constituted systems of meaning. Additionally, critical medical anthropology is consciously political.... (p. 81).

I appreciate the effort by critical medical anthropologists' to explain health beliefs and behaviors in terms of the interaction between macro- and micro-level factors. In my view, however, they overemphasize power relationships among groups of people to the exclusion of other, potentially more parsimonious, factors. For my work, at least, the critical framework offers little to account for differences in health care behaviors among individuals in a single community.

The Determinant Approach: An Expanded Framework

Figure 1–2 shows an expanded determinant framework for understanding home case management. The strength of this expanded determinant approach is the focus on behavior and on prioritizing the determinants that should be considered first when seeking explanations of medical behaviors.

Home case management behaviors are the heart of the determinant model. In pluralistic medical systems, this means that HCM practices are composed of sequences of behaviors.

First, there is the selection of treatment modalities that people use during a given illness episode. In Wombong for example, there are seven treatment modalities. In other medical systems, laypeople may have more or fewer available options. We want to explain under what conditions laypeople use some modalities and not others.

Second, we want to account for the number of modalities people use in treating illnesses. For instance, some kinds of people may use more or fewer options than do others and some kinds of illness may be managed with more or fewer modalities than are others.

Third, we want to understand what accounts for the order in which people try different treatment modalities. Why are some treatments used first, while others are used later? Under what conditions do people use a particular kind of treatment sequence?

In the approach I describe here, determinants can have different effects on treatment selection, on the number of modalities selected, and on the order of treatment selected.

The determinants of HCM behaviors are explicitly prioritized along two dimensions in this framework. This provides a guide for exploring potential factors to explain variations in behavior patterns.

The first dimension is a continuum of *classes* of determinants. This dimension is depicted by the concentric circles in Figure 1–2 and corresponds to characteristics of illness episodes, patients, caretakers, households, communities, and ethnic and regional units. Figure 1–3 shows that the continuum of determinant classes correspond to the units of analysis. The individual units of analysis, located at the bottom of Figure 1–3, are illness episodes. The patients are next, followed by the caretakers, households, and communities (in which we include health care services).

We can extend this continuum to ethnic, regional, and national units as needed. Looking down from the top of Figure 1–3, we see an increase in variation. Communities have multiple households, within which there are multiple caretakers, who take care of multiple patients with multiple illnesses.

In the determinant approach, characteristics of higher levels are useful for explaining variance at lower levels. There is, however, a limit to which higher levels are helpful. For example, in the Wombong case, I want to explain the variation in the management practices of individual illness episodes within a single community.

Characteristics of the community, because they are constant for all such management practices, are not helpful in explaining the variance in local practices.

Characteristics of households, caregivers, patients, and illnesses, however, may be helpful and may thus need to be tested empirically. If I were to examine HCM practices across several communities, then I would consider the characteristics of each community and their respective health care services.

In the approach depicted in Figure 1–2, the effect that each class of determinants may have on HCM practices is prioritized clockwise. Although the model allows that each class of determinant may have a direct effect on HCM behaviors, it implies that higher classes of determinants are more likely to indirectly affect behavior. For example, we expect to find that compound wealth influences the education level of caretakers, which in turn affects their knowledge of illnesses and preferences for certain kinds of treatment modalities, ultimately affecting their use of hospitals or clinics.

The prioritizing of classes of determinants helps guide my investigation. I do not assume, however, that classes of determinants which are closer to a particular illness episode have more explanatory power. It is an empirical question as to how much each class of determinants predicts health action. For example, if all male caretakers in a hypothetical community never try home remedies, and all female caretakers always try a home remedy, then the more proximate determinants associated with patients or illness characteristics are irrelevant for explaining the behavior.

Within each class of determinants, variables are prioritized along a second dimension that corresponds to an internal/external continuum. The external/internal

dimension is a fundamental distinction in the social sciences (Headland et al. 1990; Bernard 1994). Figure 1–4 depicts the continuum. In anthropology, researchers associate external factors with infrastructural and structural conditions in the environment while internal factors are associated with the superstructure. Internal factors are those cognitive and attitudinal factors found inside the individual. In psychology, internal factors may be further prioritized along a continuum of beliefs, attitudes, or intentions (Fishbein and Ajzen 1975; Ajzen and Fishbein 1980; Eagly and Chaiken 1993). Beliefs are more distant from actions than are attitudes or intentions.

Some researchers have claimed that external (material and economic) factors are the primary shapers of health practices (Woods and Graves 1976). Others claim that internal (cultural and mental) variables are the stronger shapers of medical behavior (Fabrega 1974; Kleinman 1980). The former emphasize understanding how demographic, technological, economic, and environmental forces affect people's actions. The latter emphasize understanding how a culture's system of beliefs affects people's behavior. Both camps agree that a wide variety of external and internal variables are correlated with behavior and both camps provide ample evidence to support their claims (see Kroeger (1983a) for review).

In so far as the determinant approach acts as a guide for research, we need to consider the rules of "the priority of infrastructure," and the "priority of proximity". Harris (Kottak 1983; Harris 1995) states that the principle of priority of infrastructure,

> holds that innovations that arise in the infrastructural sector are likely to be preserved and propagated if they enhance the efficiency of the productive and reproductive processes that sustain health and well being and that satisfy basic human bio-psychological needs and drives (p. 9).

The priority-of-infrastructure rule suggests that variables on the outside of the model depicted in Figure 1–2 offer better explanations than do those on the inside.

The priority-of-proximity principle assumes that internal variables are closer to actual practices and therefore will predict behavior better than more distant external variables. The determinant approach does not offer a solution to the apparent contradictions of these rules. It does, however, force researchers to consider both internal and external variables and make their own decisions regarding which variables to consider and the advantages and disadvantages that go along with such choices. In my analysis, I favor the priority–of–infrastructure rule.

Determinants can also be classified as either emic or etic. Emic determinants are actor-oriented explanations for behavior, while etic determinants are observer-oriented factors. The distinction was initially raised by Kenneth Pike (1954) and is thoroughly reviewed in Headland, Pike and Harris (1990). With the exception of mental variables in explanatory models, most of the determinants I have reviewed are etic.

Despite my preference for external variables, my approach to understanding treatment behavior has been an empirical one. When appropriate, I consider both internal and external variables within the same class of determinants. I then look to see how and to what degree internal and external variables are related to each other. If they are highly correlated, I select the more external variable to use in the remainder of my analysis. Otherwise, I look to see how each variable affects behavior patterns. This is rather *ad hoc*, to be sure. I consider the research reported here to be a case study that will help

illuminate, but will not solve, the theoretical problem posed by the opposition of material and idealist paradigms.

Dissertation Outline

This dissertation then is an ethnography of home case management among the Kom of Cameroon. I describe people's beliefs and attitudes about illnesses and treatments, their behavioral responses to illness episodes, and the medical environment in which home case management occurs. In my descriptions, I pay particular attention to variations in peoples' beliefs and practices within the community of Wombong.

My goal, however, is to explain laypeople's home case management behaviors. So, at a more specific level, I look to see whether a limited set of determinants can predict laypeople's use of the seven treatment modalities available in the village. Determinants include characteristics of illnesses, patients, caretakers, households, and health services. I selected the specific determinants from a review of the literature and from insights I acquired while collecting ethnographic data.

In the next two chapters I review the literature on determinants of HCM behaviors and describe the data our research team collected in Cameroon. Chapter 2 then, answers the question: "What do we know about the determinants of HCM?" Chapter 3 describes my research design, the kinds of ethnographic interviews we conducted, and the survey instruments and elicitation task we used. The remainder of the dissertation examines the data.

Chapters 4, 5, and 6 provide a general ethnographic description of the research site and laypeople's beliefs and practices related to illness and its treatment. Chapter 4 describes the local medical system in Wombong, particularly the options available to laypeople. Chapter 5 uses data from ethnographic interviews and surveys to answer the question: What do people think about illnesses? Chapter 6 uses data from the 454 illnesses episodes collected over five months to answer the question: What do people do when they get sick?

Chapter 7 uses the determinant framework I have outlined to explain treatment variation among the 454 illness episodes. The chapter answers the question: How do factors associated with individuals, compounds, and illnesses affect lay treatment behavior? Finally Chapter 8 offers some conclusions to the general question: What accounts for laypeople's home case management (HCM) behavior?

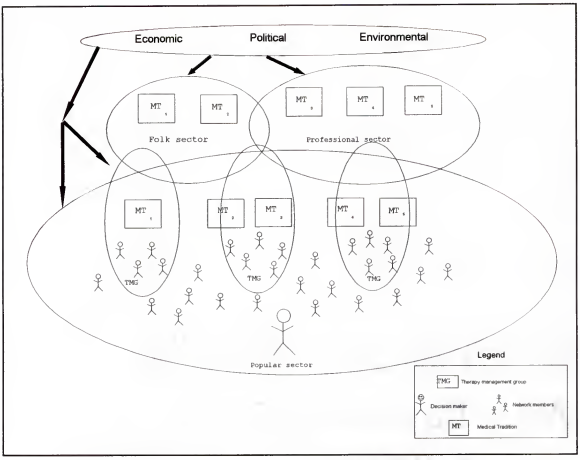


Figure 1–1 A detailed schema for understanding medical systems.

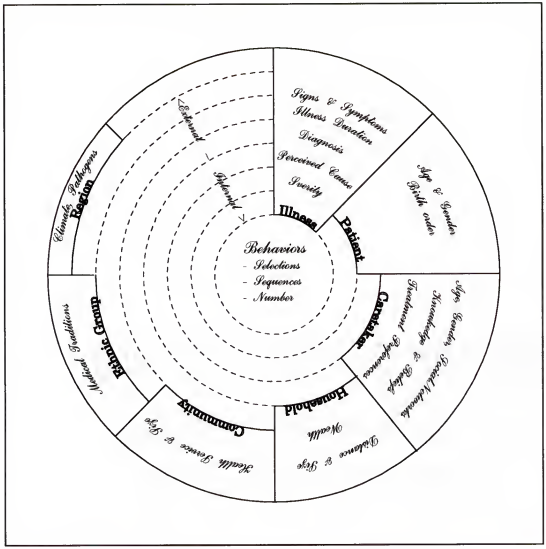


Figure 1–2 Schema of determinant approach for understanding home case management practices.

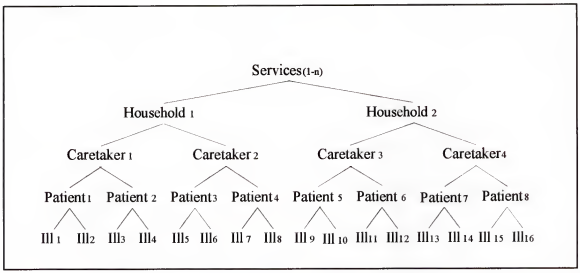


Figure 1–3 Hierarchy of units of analysis.

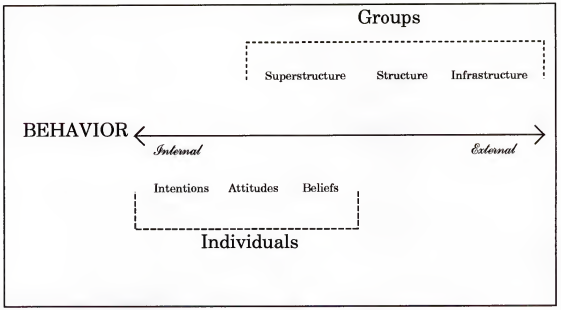


Figure 1–4 Schema of internal/external dimension of determinants.

CHAPTER 2
WHAT DO WE KNOW ABOUT DETERMINANTS OF HOME CASE MANAGEMENT?

In this chapter, I review the research on determinants of home case management practices (HCM) since the 1950s. By the late 1970s, researchers had identified most of the major determinants affecting health behaviors. These determinants are listed in Table 2–1. To organize a review of these factors, I use the determinant approach outline in the previous chapter. The first five sections of this chapter correspond to different classes of determinants. These classes include the characteristics of illnesses, patients, caretakers, households, communities and health services. The last section reviews studies that examine the effects of variables from multiple classes of determinants.

Determinants – Illness Characteristics

Researchers have noted the effects of illness episode characteristics on behavior. Some researchers suggest that the characteristics of the illness itself is the most important factor in predicting health behavior (Mechanic 1969; Colson 1971). There is no doubt that characteristics of an illness episode often drive treatment behavior. The question remains: under what circumstances is this most likely to occur?

In attempting to document the effects of illness characteristics on health action, researchers have measured characteristics of illness episodes at two fundamental levels: a) physical and biological signs and symptoms; and b) cognitive perceptions. Figure 2–1 shows that cognitive perceptions can be further divided into the initial recognition of illness and more advanced processes such as categorization (i.e. diagnosis) of the illness, attributions of causality, and perceptions of illness severity.

Individual studies tend to examine the relationship between particular levels of illness characteristics and illness behavior. Although it is legitimate to ask how do the physical and biological signs and symptoms influence people's behavior, rarely are studies designed to truly separate out the physical and biological factors from factors associated with cognition. Most studies rely on individuals' recall of signs and symptoms. Those that do study the relationship between biologically observed signs and informants' recall of events find a great deal of under reporting by informants (Belcher et al. 1976; Cogswell et al. 1991; Lipowsky et al. 1992).

Physical and Biological Signs

Past experience has taught people that certain signs and symptoms are more dangerous than others. Whether or not a layperson reacts to an illness depends on the salience, persistence, and commonness of the symptoms (Mechanic 1968).

People tend to react quickly to illnesses that are noticeable and salient, such as acute pain, convulsions, fainting, vomiting, and bleeding. Rapid changes in health status, progression from minor to grave signs, and multiple symptoms of illnesses (Goldsen 1957) have been found to be related to the utilization of medical services. For example,

in a study of relatively serious illness episodes in New York City, Suchman (1965) found that pain was clearly the most important sign that something was wrong, and was considerably more important than were fever and chills and shortness of breath. Unfortunately, Suchman failed to sample people who did not seek medical care. In addition, the study is based on reported symptoms after the doctor has been seen or hospital visited.

The more persistently ill a person feels, other factors remaining constant, the more likely he or she is to seek help. Frequent or persistent symptoms are more likely to influence a person to seek help than are occasional recurring symptoms. In contrast, people react more slowly to diseases that have slow onset, that progress from one sign to another after considerable delay and without a defined movement, and that last short periods of time. Researchers have also suggested that when an illness is common and familiar and the course of the illness is predictable, people will seek care from a physician based on their inclination to use medical services in general. As symptoms become more atypical, less familiar, and less predictable in their course, the role of social and situational factors in bringing a person to medical attention becomes less important (Mechanic and Volkart 1960).

For illnesses that have combinations of salient, persistent, or rare symptoms, people are even more likely to seek outside care. Bentley et al. (1992) report that in North India, the presence of blood in the stool was associated with an increase in the number of medical treatments given to a child, while duration of diarrhea was associated with whether a mother made a medical visit Researchers in Honduras (DeClerque et al.

1992) found that vomiting and illness duration of more than three days were associated with giving treatments. Caretakers were twice as likely to consult physicians when the child's illness lasted more than three days, than when an illness lasted less than three days. Epidemic diseases that develop dramatic and rapid symptoms are often treated with the "shotgun approach" to health care where household members try all options available [e.g. (Hsu 1955)].

Cognition - Illness Recognition

Illness recognition plays a key role in delay of health actions. Caretakers are often aware of biological signs and symptoms of their patients, but do not act until they recognize that there is a problem that needs to be resolved. Caretakers may fail to recognize illnesses if: a) the signs of the illness develop slowly, b) the signs are not particularly salient, or c) the signs are considered to be normal for the patient (Mechanic 1962).

Researchers interested in the management of childhood diarrhea and acute respiratory illnesses (ARI) have paid particular attention to the signs and symptoms that caretakers recognize. Caretakers in many developing countries, especially in rural areas, expect children to have occasional episodes of diarrhea, runny noses, and light coughs. Often caretakers consider diarrhea to be normal and associated with teething (Kendall et al. 1983; de Zoysa et al. 1984; Nichter 1988; Scrimshaw and Hurtado 1988; Stapleton 1989). Caretakers do not consider loose stools to be an illness until those stools have lasted for more than a few days, or other more severe signs are present (Bentley 1992).

In cases of ARI, fast breathing and chest indrawing often go unnoticed by household members. What signs people recognize have been shown to be related to local practices and social class (Koos 1954a). In colder climates where children are often bundled up in thick clothing, chest indrawing is rarely observed, let alone recognized as a danger sign. Recognition has been shown to be influenced by both formal and informal education (Mull, Dorothy S. et al. 1994).

Differences in recognition account for some of the discrepancies found between the signs and symptoms observed by physicians and those reported by informants (Belcher et al. 1976; Cogswell et al. 1991; Lipowsky et al. 1992). Most studies rely on self-reported symptoms as a proxy for biological symptoms. A growing body of literature suggests that relationship between the two may not be as strong as researchers would hope. [See (Kroeger 1983b; Ross and Vaughan 1986).]

Illness recognition may also be affected by other ongoing illnesses. For example, researchers have reported that some mothers considered diarrhea as normal for children with measles (Shahid et al. 1983; Weiss 1988), and that some mothers even consider it dangerous to stop the diarrhea in such cases (Mull, J. Dennis and Mull 1988).

Sometimes, caretakers may recognize and react to children's illnesses from the inconveniences they cause the caretaker rather than from the patient's signs and symptoms (1960). Martínez and Saucedo (1991) found that the best indicator of when a mother would take a child to the doctor for diarrhea was when the child complained a lot. In children brought to an outpatient clinic for non-severe pneumonia in Pakistan, mothers tended to recognize cough, fever, upper respiratory infection, phlegm and blocked nose

(Kundi et al. 1993). Researchers noted a high prevalence of symptoms noticed by the whole family (crying and coughing that interfered with everyone's sleep, for example) and the absence of notice of fast breathing.

Recognition of a problem or the need for action also plays an important role in preventative health behaviors. For example, mothers who do not perceive polio as a threat to their child are less likely to seek immunizations.

Cognition - Advanced Processes

Research on people's perception of illness has focused on three components: categories of illness (self-diagnosis), attribution of causation, and evaluation of severity. The three components are related. Many anthropological studies describe communities' ethnomedical and etiological schemata. Few of these studies explore the relationship between individual perceptions and health behaviors. Due to the fact that the three components are highly related, there is no sure way of knowing which of the three components has the greater effect on behavior.

Illness categories and diagnosis

There is ample evidence that categorizing illnesses into groups sometimes is associated with specific behavioral responses. The hot/cold distinction is a common classification schema used throughout the world. In studies of diarrheal management, researchers note that the hot/cold distinction affects what treatment people will seek or avoid (Lozoff et al. 1975; World Health Organization 1986; Mull, J. Dennis and Mull

1988; Nichter 1988; Stapleton 1989). Other investigators have found that somatic/psychosomatic and chronic/acute (Gould 1957) categories predict treatment patterns.

The dimensions and attributes that people use to categorize illnesses has been extensively studied (Frake 1961; D'Andrade 1976; Weller 1984a, b; Garro 1986a; Boster and Weller 1990). Fabrega (1971, 1975) suggested that people categorize illnesses by either signs and symptoms or by interruptions in normal behaviors. Researchers of ARI have examined the sensitivity and specificity (in the epidemiological sense of these terms) of local classifications when they are mapped onto clinically defined cases of pneumonia (Nichter 1993). The next step is to examine the sensitivity and sensitivity of local terms on health behaviors.

Illness causation

In a study of Regionville, USA, an informant nicely summarized the effect of causal perceptions on behavior, "If I had a bad backache for two weeks, like that list says, I think I'd go to the doctor, but I can't say for sure. If I knew how I did it -- say from lifting a bucket of coal--I might not go as quick as if I didn't know where it came from..." (Koos 1954b).

Early studies found that illnesses perceived as having natural causes were taken to modern sources of therapy while illnesses caused by supernatural origins were taken to traditional sources (Erasmus 1952; Simmons 1955; Foster 1958). In Ghana, Fosu (1981) found that the perceived cause of an illness had a major effect on the choice of health services.

Researchers examining infantile and childhood diarrhea management have found that certain types of illnesses, particularly those associated with supernatural causes, tend not to be brought to health services but are treated by ritual means (Lozoff et al. 1975; Kendall et al. 1983, 1984; de Zoysa et al. 1984; Coreil and Genece 1988; Stapleton 1989). In Latin America, the folk illnesses of *empacho*, *mollera caida*, and *susto* are good examples of this phenomenon (Trotter et al. 1989; Trotter 1991; Weller et al. 1991). For example, in Nicaragua, mothers associated certain categories of diarrhea with particular treatments. They recommended using purgatives for *empacho* and using ORS for diarrhea caused by infection. They did not see ORS as being helpful for diarrhea caused by parasites, worms, or empacho.

Other researchers found that categories of perceived etiology interact with other determinants to affect health actions. For example, in a rural Malay village, Colson (1971) found that the perceived etiology of the disorder and the degree of functional impairment predicted the selection of one of five therapeutic alternatives.

Despite the correlations found between the perceived cause of illness and health behavior, the causal link remains tenuous. People often arrive at their determination of causality based on whether or not a particular treatment works. Few studies are designed to test whether perceived etiologies actually cause behavior. Similar arguments can be made about the relationship between diagnostic categories and behavior. As McKinlay notes,

> when verbal statements of retrospective behavior are collected at the same time as for example, statements of beliefs and attitudes, it is just as reasonable to conclude that behavior causes belief as that belief causes behavior (1972:118).

Studies of changes in medical behaviors have suggested that practices often change before beliefs (Gould 1965; Woods and Graves 1976; DeWalt 1977) and that interpretation of causes changes with changes in socio-economic base of the people concerned (Swantz 1979).

Perceived severity

Illnesses perceived as serious bring about more concern, are more likely to be viewed as illnesses, and are more likely to bring about contact with a physician or other outside source of care (Suchman 1965; Young, J. 1980; Weller et al. 1995). Seriousness also affects the use of home remedies. In Bangladesh for example, researchers found that a much higher percentage of people chose to use sugar-salt solutions (SSS) in cases of serious diarrhea than in cases of mild diarrhea (Chowdhury and Vaughan 1988).

Some researchers have suggested that severity is one of the key determinants of health actions (Kasl and Cobb 1966; Levine, N. 1990; Bentley 1992). Caretakers develop a "wait and see attitude" toward health care by constantly monitoring the seriousness of an illness (Bentley 1988) to see how it evolves. In some models of illness behavior, severity is all important. If severity is so important, then we need to understand what leads to perceptions of severity.

Perceived seriousness is a composite evaluation and includes many factors (Bletzer 1993). [See Slovic et al. (1982) for a detailed psychological understanding of severity or risk.] Some researchers say that perceived seriousness is an estimate of present and future probability of danger. For example, researchers find that diarrhea is perceived as more serious in small children than in older children and adults (Young, J.

1980; Bentley 1988; Levine, N. 1990; Weller et al. 1995). Laypeople are more apt to view an illness as serious if the symptoms are unusual, strange, threatening, or unpredictable than if the person understands why he or she has the symptom, and what its probable course will be (Mechanic 1968). Seriousness has been related to the number of symptoms present. For example, Scheff (1966) found that after controlling for the number of symptoms reported, cultural and social factors played a considerably weaker role in influencing students use of psychiatric care facilities.

Perceived seriousness may be one of the mechanisms through which other variables such as education and social economic status affect behavior. Levine (1962) found that knowledge about a disease and acquaintance with someone who has had a disease increases the level of fear. This fear was also related to income and to the perceived expense of treatment. Studies show that people of low social status are likely to see some abnormal behaviors as serious, and therefore in need of psychiatric attention (Hollingshead and Redlich 1958). In contrast, other researchers have found that when laypeople are confronted with serious symptoms, financial considerations are relatively unimportant (Suchman 1965).

Ethnicity also plays a role in what signs are considered grave. For example, Clark (1958) found that Mexican-Americans sometimes showed grave concern over the significance of unusual bodily states which physicians viewed as 'functional variations' within the normal range. A child with 'sad eyes' or one who didn't sleep enough would be taken for treatment, while those with diarrhea were not.

Perceived seriousness, especially susceptibility, seems to be a factor in whether people report for child vaccinations or not. In an excellent review of research on social and psychological factors influencing people to accept or reject poliomyelitis vaccinations, Rosenstock et al. (1959) found that people's beliefs about their susceptibility and the seriousness of the illness, as well as their perceptions of the safety and effectiveness of the vaccination, affected vaccination rates. Because of the difficulty of measuring severity, the role of the construct is still not well defined.

Determinants – Patient Characteristics

Studies show that age, sex and birth order of patients, affect the care that they receive. These effects have been most clearly demonstrated in studies related to the home case management of children's illnesses. The mechanisms by which these determinants affect treatment behaviors, are not well established.

Age of Child

The relationship between age and care received is not linear. In Honduras, a national study found that mothers were more likely to consult a physician or use ORT with children from 6-17 months of age than with children older than 2 years and children less than 6 months (DeClerque et al. 1992). We don't know why this occurs. It seems plausible that caretakers either fail to recognize the illness in children over two years of age, or perceive this age group as being less vulnerable to the illness. In contrast,

caretakers may consider diarrhea as normal in children under 6 months of age and thus not react to it as a problem that needs solving.

Age has also been correlated with the type of care that is sought. Investigators in Zambia found that the percentage of child clients seen by doctors and outpatient wards was higher than for traditional healers (Frankenberg and Leeson 1976). The researchers note, however, that the effects of age and characteristics of the illnesses are confounded. Most children who attend the clinic or see a private doctor will have acute illnesses and therefore will either die or be cured, so that the occasion for consulting a traditional healer does not arise.

Sex of Child

The sex of a child has been shown to affect whether or not the child receives particular care (Chen et al. 1981; Escobar et al. 1983; Ravindran 1986; Hossain and Glass 1988) In Pakistan, investigators found that 58% of children brought to an outpatient clinic for non-severe pneumonia were males. This is consistent with the 55% of males that were brought to the same outpatient clinic in previous years. (Kundi et al. 1993). The question still arises as to whether this differential is due to boys suffering more severe illnesses or to cultures having higher values for male children. Also we do not know whether the behavior extends to *inside-home care management* or if it only occurs with regards to seeking of aid from more expensive centers.

Birth Order of Child

Researchers have also speculated that birth order affects child health care. Children born first may be given better and prompter care. Whether this is due to a higher value being placed on first children, or to a lack of experience and self confidence by caretakers has not been tested.

Likelihood of Survival

Some researchers suggest that active and animated children are preferred to those who are withdrawn. Scheper-Hughes (1988) reports that in Brazil, mothers who perceive their children as being weak and sickly (malnourished or dehydrated) will stop giving or will minimize care. Other researchers studying in similar sites find this to be untrue (Nations and Rebhun 1988; Nations 1992). They argue that if parents fail to obtain adequate care it is due to external factors such as lack of basic modern health care facilities and not to negative perceptions by the parent of the child.

Determinants – Caretaker Characteristics

Attributes of the caretakers have been correlated with different health behaviors. These attributes include social demographic characteristics, self-efficacy, and knowledge and experience.

Socio-demographics Factors

Social demographic factors such as age, sex, formal education, and marital status and health actions have been shown to affect utilization patterns in adults [See McKinlay (Rhoades 1982, 1984) and Kroeger (1983a) for reviews.] McKinlay argues that socio-demographic determinants explain neither why variations exist nor the mechanisms that translate the factors to differences in behavior.

Formal Education

Investigators have found that education level is tied to *inside-prevention* behaviors. In a study in Bangladesh, researchers found that more highly educated mothers and families fed their children more frequently, with fresher food, and in cleaner, more protected places. They did not feed their children with food intended for someone else, and they paid more attention to food that had been dropped. They used more cups and dishes, breastfed the child less often, and terminated breast feeding more often (Guldan et al. 1993). In a Nigerian intervention evaluation, researchers found that education, perception of cost, and length of preparation time affected whether or not women would use a fortified, home-prepared weaning food (Guptill et al. 1993). Zborowski (1952) suggests that more educated patients are more conscious of their health and more aware of pain as a possible symptom of a serious disease.

Self-efficacy

The importance of self-reliance was noted by Erasmus in 1952. He observed that Quito residents considered themselves more self-sufficient in medical treatment and diagnosis than did the average North American. Where the North American may become nervous at the slightest symptom and run to a doctor, the people Erasmus studied in

Quito applied their own extensive knowledge and beliefs to diagnose and cure their symptoms themselves. He also found that girls had more confidence in their healing abilities than did boys who showed a greater dependence on curers.

A reasonable question is whether self-confidence needs to be present before people act, or if self-confidence is acquired after people act (Graeff et al. 1993)?

Expertise

A caretaker's knowledge of: a) illnesses, b) physiology, and c) available treatment options affects treatment behavior.

Knowledge of illnesses

Knowledge and concepts of illnesses and health have been reported to affect utilization behaviors. Early work in the United States found that people with lower socio-economic status (SES) knew less about body functioning and therefore recognize fewer signs of major illnesses (Koos 1954a; Mechanic 1969). Other studies found that knowledge about diseases and acquaintance with someone who has had an illness increased the caretaker's level of fear (Levine, G. N. 1962).

Knowledge of human physiology

Studies in Guatemala attribute misconceptions about the causes of malaria to low rates of the use of prophylaxis (Ruebush et al. 1992). On the other hand, other studies have found that unconventional ideas of human physiology do not affect behavior patterns (DeWalt 1977; Hamnett and Connell 1981; Kundi et al. 1993) The mechanical view of the body appears to be associated with some behaviors. *Empacho* for instance is seen as the sticking of food in the intestines that requires some sort of unblocking

treatment often involving purges or massages. Others have speculated that one of the biggest problems with diarrhea is that people see frequent stools and assume that the best way to stop them is to stop food from going in. Unfortunately, this rule does not hold for all cultures. In some places, people do not stop food intake.

Researchers in diarrhea management have been interested in which sorts of models are apt to be most effective in supporting correct ORT use. Some researchers and program planners have felt that the use of ORT would increase if people learned the concept of preventing and treating dehydration (Eiseman et al. 1988; Patel et al. 1988). In other words, if people only understood how ORT worked to rehydrate the body, they would use the treatment correctly.

Levine (1990) reviews studies that suggest that such assumptions are not true. Studies in India found that awareness of diarrhea fatalities and maternal education better predicted ORT use than did knowledge about dehydration (Bentley 1988). Work in Haiti found that regardless of whether Haitians thought that ORT replaced lost water, cured diarrhea, or prevented dehydration, they were equally likely to think ORT was effective (Bentley 1988; Coreil and Genece 1988). Efforts to introduce the concept of dehydration have also been disappointing. Most studies concentrate on how to best teach the concept and fewer have examined how the concept may or may not affect utilization rates. Some researchers have recommended marketing ORS as a *strengthening* fluid rather than to continue to teach concepts of dehydration.

Knowledge of available health options

Knowledge of treatment availability is also critical in determining health behavior. Although it seems as if they are blaming the victim, studies of underutilization of health services in slums of New York found that underutilizers lacked knowledge of how the complex health care system worked (Rosenblatt and Suchman 1964). Trotter (1981) found Mexican American knowledge of home remedies differed by age and sex. He failed to note, however, whether this was tied to health behaviors. Administration of incorrect dosages of pharmaceutical products has been attributed to lack of knowledge (Ruebush et al. 1992).

Lack of knowledge of how to mix sugar-salt solutions has been attributed to low utilization rates (Mull, J. Dennis and Mull 1988). This knowledge is transitory. In Bangladesh, for example, nearly all mothers taught SSS were able to prepare safe SSS one, three, and six months after face-to-face instructions. Yet two years later 15% were preparing solutions dangerously high in salt (Chowdhury et al. 1988).

Past experience

In Pakistan, mother's who had past experience with pneumonia reported waiting fewer days before coming to the hospital. Those without past experience were less likely to overlook fast breathing, but more likely to see chest indrawing when it wasn't there (Kundi et al. 1993).

Determinants – Household Characteristics

Characteristics of the household have been shown to be related to health actions. Socio-demographic factors such as household size and composition, ethnicity, and degree of cultural adaptation, and availability of resources and time influence health patterns.

Socio-demographic Factors

Ethnicity

Ethnicity appears to have multiple effects on the management of illness. Ethnicity has been related to: a) the response to pain (Zborowski 1952; Sternbach and Tursky 1965; Wolff and Langley 1968); b) the number of symptoms reported (Croog 1961), c) the frequency of health-seeking (Mechanic 1963) and prevention-seeking behaviors (Suchman 1964); and d) the medical services used (Lin et al. 1978; Fabrega and Manning 1979). In most studies that examine household characteristics, ethnicity, class, and socio-economic status are intricately related and the effects of one are difficult to isolate.

In his review of utilization behaviors, Mechanic (1968) suggests that ethnicity may have a stronger affect than SES on illness behavior. He notes, however, that variation within ethnic groups is often greater than it is between groups and therefore ethnicity may not be very useful in predicting individual behaviors. In addition, although it is true that culturally learned behaviors are important, such differences explain only a small proportion of the total variation in behavior. For example, in a study of 61 families in Mexico, DeWalt (1977) found that wealth was clearly the most important factor in the

use of physicians, but ethnicity still contributed a small but significant amount to the explained variance.

Other factors

Some researchers have suggested that relative acculturation accounts for variations in health behaviors (Saunders 1954; Maclean 1965, 1966, 1969; Schwartz 1969). A number of specific measures have been employed including the amount of formal education, spatial mobility, age, amount of cross-cultural contact, degree of participation in traditional religious activities, occupational mobility, and the aspects of material culture. Other investigators argue that this approach is often circular as the use of modern medical facilities is frequently treated as a measure of acculturation (Colson 1971) . "Innovation theory" holds that individuals who are innovators will use new behavioral alternatives before other community members (Rogers 1962, 1969). Press (1969) argues that these approaches are not either/or choices.

Availability of Funds to Buy Drugs, Seek Care

Most studies of availability of funds have examined the socio-economic status (SES) or *relative wealth* (Gould 1957; Foster 1962) of households. SES and *relative wealth* measure a household's access to resources relative to other households in the community. These measures tend to be stable over time. Studies of health action are less apt to measure the immediate availability of funds within a household due to the difficulty of collecting accurate data. Available funds may vary by agricultural season. At any given time, a household may or may not have resources available to perform potential health actions. [See Oths (Oths 1994) and Weller (1995) for a review of the

literature on multiple effects of wealth on treatment behaviors.]

Substantial literature demonstrates that low socio-economic status (SES) is associated with lower utilization levels of medical services (Gould 1957; Rosenblatt and Suchman 1963; Woods and Graves 1976; DeWalt 1977). Foster (1977) goes as far as to reject his earlier theory that people selected treatments based on a simplistic dichotomous model where laypeople divided illnesses into two categories: those that medical doctors cured and those they did not know about. Foster claims,

> I am increasingly convinced that economic and social costs are more important in determining the use or nonuse of scientific medicine than is the belief-conflict between traditional and modern medicine. ... I suggest that people will change traditional behavior, i.e. innovate, if: 1) they perceive personal economic, social, psychological, health, or other advantages in so doing; 2) they perceive change as a realistic possibility for them; 3) the economic costs are within their capabilities; 4) the social costs do not outweigh the perceived advantage (1977:529).

Without doubt, low SES is confounded with lower levels of knowledge, acceptance of higher levels of discomfort (Freeman and Simmons 1963), and less ease in medical settings (Ludwig and Gibson 1969). Various mechanisms by which SES affects behavior patterns have been suggested. Gould found in North India that higher SES: a) enabled members of the upper four castes to afford the services of a doctor whenever they were inclined to employ one; b) facilitated greater formal education among the upper four castes, making them more aware of and favorably disposed toward the scientific approach to disease; and c) provided greater opportunity for spatial and occupational mobility to the upper four castes, the effect of which was to put them in easier material and psychological contact with clinics and doctors (1957:512). Others

have suggested that SES is related to perceived seriousness of symptoms (Hollingshead and Redlich 1958), and perceived expense of treatment (Levine, G. N. 1962).

Although inadequate income explains in part why low income groups fail to purchase medical services, it does not explain the failure in full. SES is a summary variable; that is, it incorporates multiple determinants. As a result, the predictive power of SES, although statistically significant, is still weak. For example, even in DeWalt's study (where wealth was the most significant determinant of physician use) wealth only accounted for 18% of the variance. "Relative wealth," may act as a barrier to the use of some therapeutic alternatives, but as some investigators note, the elimination of barriers to an alternative does not necessarily provide the motivation to choose that alternative (Colson 1971).

Availability of Time and Effort to Administer Health Care

In addition to funds, households have a limited amount of time and effort to spend on health care. Some researchers have found that the choice of therapy depends more on the availability of time (Lasker 1981). Again, this determinant may be dependent on SES such that low income families may have less time available to spend on health care.

Determinants – Community Characteristics

Some investigators have examined how social forces affect health behavior (Parsons 1958; Young, A. 1976; Pilisuk and Froland 1978; Mueller 1980). Since there is often a lot of intracultural variation within communities, characteristics of communities

are meaningless. Some researchers advocate looking at the social networks of individual caretakers (Suchman 1964; Nall and Speilberg 1967; Weaver 1970; McKinlay 1972, 1973; Ailinger 1977; Chrisman 1977) . Social networks affect health behaviors in two ways: a) they facilitate the transfer of resources, particularly information; and b) they are a mechanism by which social pressure is applied to individuals. Not only do networks provide access to resources, but as options increase, they allow one to test experience against that of others and to reinforce or modify one's judgment for subsequent behavior (Lasker 1981).

The affect of social networks on health has long been known as the *lay referral system* (Freidson 1959; Polgar 1963; Weaver 1970; Ailinger 1977). People first try some remedies then discuss their troubles with neighbors, friends and fellow workers in a causal way and explore alternative explanations for the way they are feeling. They seek advice from others as to whether they should seek care and from whom.

Researchers have found that the presence of spouses or relatives (Nall and Speilberg 1967; McKinlay 1973), the cohesiveness of the social group in which people are embedded (Suchman 1964); and the insularity of people in a social network (Chrisman 1977; Hammer 1983) affect utilization patterns. Word-of-mouth referral is common throughout the world (Dobkin de Rios 1981), and needs more systematic study (Reingen and Kernan 1986; Brown and Reingen 1987).

Determinants – Community & Health Service Characteristics

Some researchers have stressed the importance of characteristics of health care (Foster 1977). As the number of alternatives increases: laypeople a) use more precise judgment to select among alternatives (Lasker 1981); and b) wait less for results of such treatments before trying something else (Nichter 1980). In places where there are fewer alternatives to choose from, the characteristics of the options are less important. For example, utilization rates for ORS or SSS have been found to be higher in places where ORS or SSS are the only options available to mothers for treating childhood diarrhea (Frankel and Lehmann 1984; Spain and McDivitt 1988).

The data suggest that people use first what is available to them and that in severe illnesses cases, they are willing to make a greater effort to try something else that might work better (Lasker 1981). In other words, the criteria for selecting among alternative treatments changes with the perceived gravity of the illness (Young, J. 1980). Some researchers have found that when serious symptoms are present, financial considerations are relatively unimportant (Suchman 1965; Ryan and Martínez in press).

Health actions that occur inside the household have been shown to be affected by costs, ease of preparation, efficacy, availability of ingredients (Bentley 1988), and willingness of patient to undergo the treatment. In Nigeria, researchers found that perception of cost and length of preparation time affected whether or not women would use a fortified, home-prepared weaning food. The perception of cost was not linked to material indicators of wealth. (Guptill et al. 1993). Various studies have found that

children will not accept ORS or SSS because they don't like the taste (Frankel and Lehmann 1984; Green 1986; Bentley 1988; Bentley et al. 1988; Mull, J. Dennis and Mull 1988).

Health-seeking behaviors have been shown to be affected by distance, availability of transport, costs, waiting time during service, types of health workers, hours that the services are provided, skills of health workers, language in which services are provided, methods of communication between caretakers and medical personnel, and general quality of care (Stoeckle et al. 1963; Weaver 1970; Vera 1993).

It is still, however, an empirical question as to which of these constraints on behavior keep people from attending Western health facilities. Investigators rarely design studies to test whether a particular constraint predicts whether people use or do not use an available treatment option. More often, researchers query patients about reasons for attending a particular clinic and do not test whether these reasons help predict the behavior of another group of individuals (Vera 1993). In other words, we have no idea how *specific* or *sensitive* constraints are in predicting behavior.

Determinants – Multiple Classes

Several studies have examined the effects of multiple levels of determinants on health actions. In a classic study to determine whether material and economic factors or beliefs and cognitive factors were better predictors of health behaviors, Woods and Graves (1976) examine the health behaviors of 40 Indian and 15 Ladino households in Mexico over a six month period. They conclude that the cash economy exposes a person

to modern ideas and practices (despite the fact that increased wealth increases ceremonial responsibilities, reinforcing traditional epistemology). Cash produces exposure, which in turn produces innovatedness, which leads to new practices and then new beliefs. "Neither exposure to the outside world, nor the predisposition to entertain new ideas (Innovativeness) which promotes, appears to directly undermine traditional beliefs. Rather, these beliefs appear to be highly resistant to change until they are found incompatible with changes in behavior" (pp. 375-376). Similar patterns have been found in Peru and Chile (Simmons 1955) and in Mexico (1977).

In a study of all children's deaths under 5 years of age in Indramayu, West Java, Sutrisna et al. (1993) found that seeking western care was associated with: age of child, duration of illness, previous attendance of mother at community-based maternal-and-child-health facility, and the mother's answers to a question about where she would seek care for a 1-month old baby with signs of severe pneumonia. Household income, maternal age, education, and distance to government health post were not associated with care-seeking behavior.

In a larger study of applicants for social security benefits, investigators found that two life situational factors of income and welfare contact, and three measures of system orientation (medical scientific orientation, agency orientation, anomie) were related to the seeking of medical care but urgency and number of symptoms were not (Ludwig and Gibson 1969). Subjects with low income, recent welfare contact, and negative system orientation were most likely to fail to seek medical attention. Moreover, a negative system orientation proved to be associated with low income and welfare experience

suggesting that negative orientations are created by situational factors and serve as rationalizations for failure to seek care when situational factors make it difficult to do so.

A study in India found that several health belief items predicted whether tuberculosis patients complied with a particular medical regime or not (Barnhoorn and Adriaanse 1992). These items included patients' health motivation and self efficacy, patients' perceptions of disease severity, and anticipated costs and benefits of the treatment regimen. Compliers reported more physical symptoms at the onset of the disease, whereas more noncompliers mentioned a deteriorated health condition at the time of interviewing. Low associations were found between demographic and socioeconomic variables and adherence, except for some indicators of income level. The relationship between presence of social support and cooperation with the treatment procedure was confirmed. Patients who had more knowledge of specific aspects of the disease, who knew more about the origin of tuberculosis, and who had a better understanding of the drug regimen were more likely to comply than were other patients. Satisfaction with the health care provider also contributed positively to the continuation of drug intake.

Studies that use determinants from multiple classes typically explain more variance in behavior patterns. They do not, however, explain the mechanism by which more distant determinants affect the behaviors. Statistical significance does not prove causality, nor does it always assist program planners in making policy decisions.

Given the large number of potential determinants (as shown in Table 2–1), researchers must select a limited number of variables to include in any study. No study

attempts to measure all the determinants. Researchers can: a) select determinants on theoretical grounds (internal variables only for example); b) select determinants used in other studies pertaining to the same behavior of interest; c) take some determinants along multiple dimensions; d) conduct ethnographic studies to ask informants to help in the selection of the determinants. In this study, I used a combination of all four to select my list of determinants. The variables I chose are listed in Table 2–2.

Once the determinants of interest are selected, how to measure the variable must be solved. Most investigations rely on previous studies to design their measures. However, modifications in measurement protocols, or failure to adequately report measurement protocols, makes comparisons across studies difficult. In the following chapter, I describe in detail the measures I used.

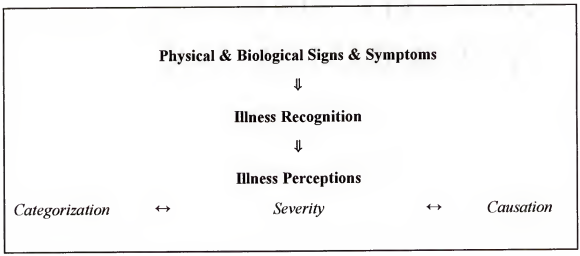


Figure 2–1 Types of illness characteristics.

Table 2–1 Major determinants of home case management practices.

	General ↔ *Specific*				
	Classes of Determinants				
Specific Determinants	Community & Health Services	Household	Caretaker	Patient	Illness
External ↕	*Self-Based* cost ease of preparation efficacy availability of ingredients *Provider-Based* availability cost location waiting time type of workers hours of service skill level of personnel language communication skills	*Social/Demographic* size/composition ethnicity acculturation occupations innovators *Availability of funds* socio-economic status immediate funds *Availability of Time*	*Social/Demographic* age sex formal education marital status *Social Networks* size composition structure *Self-Efficacy* *Skill Level* knowledge of healing past experience *Goals of health action*	*Social/Demographic* age sex birth order *Health status* weakly? normal appearance	*Biological Signs/Sympt.* *Concurrent with other ills* *Rapid/slow onset* *Episode duration* *Changes in illness characteristics* change in signs/sympt. quickness of change
Internal	*Caretaker's Perceptions:* expected benefits expected costs accessibility local appeal community acceptability efficacy		*Explanatory Models* severity recognition distinctions chronic/acute pysch/somatic illness taxonomies etiological models	*Caretaker's Perceptions of:* likelihood of survival susceptibility to illness	Caretaker's Perceptions of: illness severity diagnosis cause of illness

Table 2–2 Dependent variables selected for use in analysis.

Classes of Determnants *Specific Variables*	Variable Code	Type of Data	Description
Illness			
Diagnosis	–	Binary	Check list of 7 illness terms
Signs/symptoms	–	Binary	Check list of 14 signs
Causality	–	Binary	Check list of 9 causal attributions
Severity			
# of signs/symptoms	SEVCNT	Interval	Total number of signs mentioned
behavioral changes	SEVBEH	Interval	Bed rest, no work/school, sun avoidance
duration	LAST	Interval	Length of episode in days
emic evaluation	SEVEMIC	Binary	Caretaker evaluation of illness (weak/strong)
Patient			
Age	PAGE	Interval	Age in years
Sex	PSEX	Binary	Gender
Primary Caretaker			
Age	CAGE	Interval	Age in years
Sex	CSEX	Binary	Gender
Education	EDUC	Interval	Years of formal schooling
Literate	LITURATE		
Healer	HEALER	Binary	Considered healer or not
Past Caretaking Experience	BEHCARE	Interval	# episodes acted as primary caretaker in 5 monthss
Knowledge			
# illnesses heal	ILLSELF	Interval	# of 32 illnesses for which know home remedies
popular	POPSELF	Interval	# of 32 popular illnesses for which know remedy
general	GENSELF	Interval	# of 32 general illnesses for which know remedy
# ills know healer	ILLHEAL	Interval	# of 32 illnesses for which know healer
popular	POPHEAL	Interval	# of 32 popular illnesses for which know healer
general	GENHEAL	Interval	# of 16 gen. ills for which know healer
unique healers known	UNHEAL	Interval	# of unique healers known
preferences			
pharmaceuticals	PRPHARM	Interval	# of times pharms. chosen first among 21 ills
clinic	PRCLINIC	Interval	# of times clinic chosen first among 21 ills
hospital	PRHOSP	Interval	# of times hospital chosen first among 21 ills
home rem./healer	PRHEAL	Interval	# of times country med. chosen first among 21 ills
favorite	FAVOR	Binary	Chose a single treatment first in > 11 illnesses
Networks			
total size	PALL	Interval	# of people knew in picture survey
total strong ties	PSTRONG	Interval	# of people knew well in picture survey

Table 2–2 -- Continued

Classes of *Specific Variables*	Variable Code	Type of Data	Description
Primary Caretaker (Cont.)			
Networks (Cont.)			
total weak ties	PWEAK	Interval	# of people knew weakly in picture survey
kin size	KALL	Interval	# of kin knew in picture survey
kin strong ties	KSTRONG	Interval	# of kin knew well in picture survey
kin weak ties	KWEAK	Interval	# of kin knew weakly in picture survey
% males	MALE%	Ratio	% of men known in picture survey
% females	FEM%	Ratio	% of women known in picture survey
% healers	HEAL%	Ratio	% of healers known in picture survey
average age	AVAGE	Ratio	Average age of network members
average education	AVEDUC	Ratio	Average education of network members
average children	AVCHILD	Ratio	Average # of children that network members have
density	DAVAV	Ratio	Density of social network
total centrality	PDEG	Ratio	Degree to which centrally located in network
kin centrality	KDEG	Ratio	Degree to which centrally located in kin network
Household			
Location	QUARTER	Rank	Quarter location relative to distance from hospital
Men	TAM	Interval	# of adult men in compound
Women	TAF	Interval	# of adult women in compound
Children	TC	Interval	# of children in compound
Healers	CHEALS	Interval	# of healer in compound
Illnesses	CILLS	Interval	# of illnesses experienced in compound
Economic Wealth			
material wealth	ECOPOS	Rank	Guttman scale of material objects
emic estimate	EYEBALL	Rank	Rating of household wealth by research assistants

CHAPTER 3
KOM: RESEARCH DESIGN AND DATA COLLECTION

A six-person research team collected data for this study over 18 months from January 1992 through June 1993 in the village of Wombong, a hamlet of approximately 1600 people. As the team's leader, I designed and coordinated the research activities. Four local research assistants helped conduct, translate, and transcribe the interviews and surveys that we administered to over 300 different local residents.

For a week we walked throughout the village at different times of the day and selected compounds where we encountered people at home. At the end of the week, we had identified a sample of 120 compounds (or 48% of the compounds in the village). The compounds were dispersed throughout the village. Although there is continued debate in anthropology over the definition of compounds and households (Wilk 1991), we defined a compound as an extended family sharing the same common court yard. One to three nuclear families resided in each compound. For the 82 compounds for which we have census data, compound size ranged from 1 to 11 adult members with a mean of 3.8 (sd 2.1). On average, there were 3.1 (sd 4.2) children under the age of 15 in each compound. The sample of 120 compounds is demographically and socio-economically representative of the village population.

Throughout the 18 months of research we conducted 15 different surveys and 5 different kinds of ethnographic interviews. We selected respondents and informants from

the sample of 120 compounds. Unless otherwise noted, all informants were selected from the sampling frame of identified compounds. Most surveys were conducted over at least a month long period so that interviewers visited each compound several times, on different days and at different hours. Respondents participated in 1 to 10 different kinds of surveys over the entire study period. Some informants also participated in multiple ethnographic interviews. Table 3–1 describes the number of respondents and compounds that participated in each of the surveys.

In addition to collecting data on local environment, we also collected four types of information from our sample of compounds, including data on: a) socio-economics and demographics; b) knowledge; c) behaviors; and d) social networks. Depending on the information needed, the units of analysis were: individuals, compounds, or illness episodes. Some of the data come from informant recall or opinion, while other data come from unobtrusive measures or from outside sources. Below, I describe how we collected the different types of data. The names given each of the data collection procedures will be used throughout the dissertation. Copies of all surveys and interview schedules are in Appendix A.

Data on the Local Medical Environment

Ethnographic Interviews with Local Health Care Providers

We conducted ethnographic interviews with administrators of the hospital and health center as well as with retired health care workers, local hawkers, store owners and

traditional healers. We paid particular attention to their conceptualization of the local health care system and their impressions of laypeople's care-seeking behavior.

Detailed outline of local health history

We interviewed local health administrators in Kom, including the hospital and clinic. We also interviewed older people about changes they had seen in health and health care over the years. There are few written documents available. We also conducted a number of key informant interviews on the history of Wombong village.

Counts of Traditional Healers

We used the survey of laypeoples' knowledge of healers to identify all the healers in the community (N=34). Some of these healers were already in our sample. For those who weren't in our sample, we presented them with the "lay knowledge of home remedies" survey. We also conducted ethnographic interviews with a number of these local specialists.

Availability of Pharmaceutical Products

We identified and interviewed nearly all of the sellers of pharmaceutical products in the community. We also recorded what pills are sold in stores nearby and how much they cost. We interviewed vendors about their prescribed doses for adults and children for a variety of common illnesses. One member of the team, George Mbeh, acted as a confederate with the hawkers in the market place. Each week we chose a new illness complaint and approached different hawkers. We then recorded what they prescribed and the cost of treatment.

Economic/Demographic Data

We collected economic and demographic data from individuals and from compounds. For every participant who responded to one of our surveys or agreed to be interviewed (N=282), we collected the following personal data: name, sex, age, education, occupation, religion, number of children. We also asked where their farm was located (if appropriate), how often they worked at the local coffee cooperative, and what organizations they belonged to. Compound level data included surveys of demographics and material possessions, as well as official population records.

Compound Demographic Survey

Administered to 82 study compounds, this survey records the number and ages of males, females, children, and adults in each compound, as well as the education level of each adult.

Compound Economic Survey

Administered to 108 of the study compounds, this survey examines the material possessions in each compound. Researchers have argued that material scales of wealth are more reliable measures of socio-economic status than are measurements based on recall data (DeWalt, B. R. 1979; Bernard 1994). The survey records: the size and construction materials of the largest house in the compound; whether or not the compound has electricity, running water, or a generator; the construction of toilets; material possessions such as kinds of chairs, radio, television, iron, motocycle, car,

cupboard, corn mill, tables, lamps, and coffee hullers; number of wives; number of persons who earn a regular salary or hourly wage; number of people on a pension, or who farm; the highest education level of anyone in the compound; number of goats, and number of bags of coffee produced the previous year. The data formed a ten-item Guttman scale (Cronback's alpha = 0.70, coefficient of reproducibility = 0.94). The analysis is described in greater detail in Chapter 4. I used a shorter version in the economic and demographic survey described below.

Random Economic/demographic Survey

After mapping all the compounds in the village (N=250), I randomly selected a subsample (N=176) and administered a shortened version of the economic and demographic surveys. The economic survey includes the ten questions that formed a Guttman scale from the longer economic survey. The data from this survey allow me to estimate the population of Wombong and to see how representative the study compounds are compared to the rest of the village.

Official Population Data

I obtained the official government population statistics broken down by age for Wombong and the larger administrative district of Boyo. The figures are only broken down by sex for women of reproductive age (15-45)

Knowledge Data

We collected data on two types of knowledge: laypeople's knowledge of illnesses, and laypeople's knowledge of local health care alternatives. We used a variety of elicitation techniques to probe peoples' understanding of illnesses and treatment options, including: free lists, pile sorts, triad tests, ethnographic interviews, and structured surveys. These techniques have all been described in detail by Bernard (1994), Weller and Romney (1988), and Werner (1987). Below, I describe the knowledge data we collected. I briefly explain the elicitation techniques we used and where appropriate cite health-related or more detailed examples.

Illnesses and Illness Categories

Free lists of local illness terms

We asked 22 informants for unprompted free lists of local illness terms. Free lists allowed us to efficiently generate an extensive list of local terms. Terms mentioned by more informants suggest the illness is salient in the community (Trotter 1981; Smith 1993). Here saliency can refer to either commonness or perceived threat. Informants listed from 4 to 26 different illnesses (10.3 illness on average) yielding a complete list of 77 unique illnesses terms.

Translations of Kom illness terms

We had three local experts translate the 77 Kom illness terms elicited from the free lists into English. The local experts included three registered nurses, and two literate Kom speakers.

Pile sorts of 36 illness terms

We selected the 36 most-commonly mentioned illnesses from the free list and asked (N=11) literate informants to perform successive pile sorts on the 36 illnesses. Successive piles sorts provide more detailed information than do free pile sorts about the relationships between the items (illness terms) (Boster 1994). Because each informant performs the exact same task, we can also compare informants. We printed each illness term on a small index card and spread the cards out on a table. We asked informants to read us the names of all the illness terms to be sure that they understood each term. We asked them to separate out any terms they did not know. (All informants knew all 36 terms.) We then instructed informants to sort the cards into as many piles as they wanted, using any criteria they deemed appropriate. After they had completed the first sort, we asked them to join their piles together one by one until there were only two piles. We then separated the piles into the original groups and asked the informant to divide one of the piles into two groups. We continued this until the informant had split up all the piles. For some of the informants, we asked them to explain how and why they had split the illnesses into different groups.

Illness-focused ethnographic interviews

We also conducted ethnographic interviews with 39 informants on their beliefs about illnesses, illness categories, and treatment preferences. To keep interviews relatively short, we conducted separate interviews for: a) head and fever-related illnesses; b) chest-related illnesses; and c) stomach-related illnesses. We followed a general interview schedule that probed informants for information about signs and symptoms,

appropriate treatments, and who certain illnesses affected. We tape recorded all interviews. Many of the interviews were transcribed verbatim in Kom, then translated from Kom into English by the same person, Mr. George Mbeh. Other interviews were translated in their entirety directly into English. In the English translation, we left all Kom words pertaining to illnesses, signs, or symptoms in the vernacular. We preserved all transcribed and translated text on a laptop computer to facilitate later coding, searching, and retrieving procedures. The corpus of text totals over 2000 pages.

Illness seriousness scale (Likert)

To assess people's perceptions of illness seriousness, we devised a 5-point seriousness scale for 31 illnesses. We first asked respondents (N=53) if the illness was weak, strong, or neutral. If the response was either weak or strong, then we asked if it is very or only somewhat weak or strong. The data were coded 1 through 5, where 5 was the most serious.

Illness seriousness scale (magnitude)

We also asked informants (N=50) to indicate the seriousness of the same 31 illnesses on a magnitude scale. Magnitude scaling provides more detailed information than Likert scaling (Lodge 1981). We presented informants with a ruler that had a 40-milimeter line marked on it. We told informants that the line represented the seriousness of *akesi* (cough). We then asked informants to draw a line indicating how serious they thought each of the other illness was. Informants drew a line longer than 40 miliimeters if they thought the illness was more serious than *akesi* or a shorter line if the illness was less serious. The maximum length of the line was confined to the width of the page, 210

milimeters. Of the 50 respondents, 25 completed both the Likert and magnitude seriousness scales.

Treatments and Treatment Categories

Treatment preference survey

We selected 21 illnesses from our initial analysis of the free list and pile sort data. These illnesses were representative of the different classes of illnesses Kom laypeople perceived. We designed a survey that would explore people's treatment preferences or "hierarchy of resort" (Schwartz 1969) for each illness. We asked respondents (N=229) to tell us which of five treatment modalities (home remedy, health clinic, traditional healer or private nurse) they would try first, second, third, fourth, and fifth if they or their child was confronted with each of the illnesses. The interview produced a complete ranking of treatment preferences for all 21 illnesses.

Triad test of treatment similarity

We asked both literate and non literate informants (N=20) to complete triad tests for 6 treatment modalities. These included: hospital, health center, private nurse, traditional healer, traditional home remedy, pills bought at a local store. We used a lambda-2 balanced block design for 6 items. This produced 20 sets of triads where all pairs of items appeared twice (Burton and Nerlove 1976). The triads were randomized for each informant using *ANTHROPAC 3.22* (Borgatti 1990). For each triad, we read the three treatment modalities and asked informants to identify the item that was the most different. We realized that a paired comparison task would have yielded more detailed

information, but we found that triad tests were easier to administer and were less boring to nonliterate informants than the alternative elicitation task.

Lay knowledge of traditional healers survey

We asked informants (N=202) if they knew how to cure each of 31 illness or if they knew anyone else who did. When respondents said that they knew someone who cured that particular illness, we recorded information about the person mentioned. Questions included: a) Is this person related to you?; b) Is this person a healer?; c) Does this person live in the compound?; and d) What sex is this person? In addition, we asked informants to tell us the name of the healer and where he or she lived. We used this information to generate a prompted free list of healers in Wombong and outlying areas. We also cross referenced healers with particular illnesses they were said to cure.

Lay knowledge of home remedies survey

From among the respondents who answered the traditional healer survey, we randomly selected a subsample of individuals (N=94) to ask additional questions about their knowledge of home remedies. We returned to each informant with the list of the illnesses they had claimed to know how to cure in the previous survey. Lists of illnesses ranged from 1 to 26 with an average of 6.9. As an accuracy check, we asked each informant whether they knew how to cure each of the illnesses on the list. (For roughly 10% of all the illnesses informants had previously claimed to know how to cure, informants claimed they did not know how to cure the illness when we asked a second time.) For those illnesses that they confirmed knowing how to cure, we asked the following six questions: a) Who taught you this cure? (recorded as: no relation,

brother/sister/cousin, mother/father/uncle/aunt, grandfather/grandmother/great uncle/great aunt, other); b) Does the person live in this compound?; c) Is this person a healer?; d) What sex is the person?; e) Did you have to give anything to learn this cure?; and f) Do you treat people from outside the compound?

Free list of pharmaceutical products

We asked 23 informants to list all the pharmaceuticals products they knew. When they had completed the list we asked them to indicate what illnesses each of the products cured.

Lay knowledge of pharmaceutical products survey

We designed a survey to lay perceptions of the relationships between the 12 most common pharmaceuticals and the 20 most common illnesses. We first asked each informant whether or not they had heard of each of 12 pharmaceutical products. We then asked whether or not each of the known products were used on each of the 20 illnesses. For each informant, this produces a 20 by 12 illness-by-product matrix. Columns of products that were not known were left blank; otherwise they were filled with 1's or 0's. If a product was used for a particular illness, the cell contained a 1, otherwise it was filled with a 0. We surveyed 39 people in the village.

Treatment-based ethnographic interviews

We supplemented each of the above surveys with ethnographic interviews. All the interviews have been translated, transcribed, and entered into the computer.

Behavior Data

We collected two types of behavioral information: self-reported and unobtrusive observation data. The self-reported data come from a longitudinal study of 88 compounds over a 5-month period. The units of analysis were illness episodes. We recorded multiple episodes for compounds, patients, and caretakers. The unobtrusive obervation data come from official records kept by the hospital, health clinic, and local nurse. Like the self-reported data, we collected data based on illnesses episodes rather than on compounds or individuals.

Self-Reported Behavior

Illness episode survey

Many studies of health behaviors are heavily descriptive and few have strong predictive power. Others tend to examine the more exotic, and often less frequent, practices in a community (Yap 1951) making generalizations difficult. Those studies that do try to test hypotheses are often plagued with methodological problems, raising questions about the validity of the results.

The most fundamental methodological weakness is the measurement of the dependent variable — health behaviors. Since health actions occur relatively infrequently, researchers rarely collect data on observable behavior and rely on informant recall of behavior. Recall data, however, are prone to error (Deutscher 1973; Bernard et al. 1984). Comprehensive articles that state the problem explicitly and offer specific techniques for improving the accuracy of recall (Elinson 1963; McKinlay 1972; Kroeger

1983b; Ross and Vaughan 1986) are largely ignored by investigators. Even using all the techniques for improving accuracy still begs the questions: How much error is there? And what direction does it go? (Bernard et al. 1984)

Worse, some studies use informants' "intent to behave" or informants' attitude toward the behavior of interest as a proxy for behavior. (See Graeff et al. (1993) for a review.) Such studies make a large leap of faith assuming that intent to act and attitude are related to what people do. This problem is particularly evident in applied research. Researchers evaluating intervention projects find it easier to measure changes in intent or attitude than to measure changes in health action.

The other major problem in understanding health actions is that there is no standardization in studies, not even for morbidity studies that are done throughout the world (Kroeger 1983b). Although researchers have made suggestions for such standardizations 20 years ago (Fabrega 1975), only a few studies have tried to compare health actions across cultures or countries (Mathews and Hill 1990). Despite these problems, I have tried to provide a general feel for what investigators have found affects health actions.

We originally selected a sample of 94 (or 37.6%) of the compounds in the village. We chose compounds where we had already collected the most data from the treatment preference and picture surveys. We avoided compounds where we only had one previous respondent. Our sample of compounds decreased to 88 due to attrition.

We visited each compound every week, from October 1992 to February 1993. This corresponded to the end of the wet season and the beginning of the dry season. During each visit, we recorded non-chronic illnesses and how people treated them. We asked if

anyone had been sick in the compound over the last week. We identified all past or current illness episodes and then interviewed the primary caregiver for each episode. The interviews were structured to collect data on: patient and caregiver demographics (age, sex, education), illness episode (perceived illness signs, symptoms, causes, and duration) and treatment behavior.

Forced to rely on informant recall of treatment behavior, we used several techniques to reduce informant inaccuracy. The literature on informant accuracy suggests that people are better at remembering events that occur recently rather than from the more distant past, and we only considered illness cases that had begun less than a week earlier. The literature also suggests that people are better at remembering whether they did something or not (yes or no) than they are at remembering how often they did it. Consequently, we did not ask informants to remember the number of pills they administered or the number of times they visited a single local healer.

To confirm the accuracy of informants' recall, as well as our own recording accuracy, we asked primary caretakers to tell us in their own words what they had done to treat the patient and we noted all treatment modalities (and their order) on a standardized form. We then queried informants directly about the order in which they had administered the different treatments and continued questioning until we were sure that we had recorded the treatment order exactly as the informant remembered it.

Finally, we asked informants whether they had used any of a list of treatment they had not mentioned. This last step sometimes helped informants to recall treatments that they had previously forgotten. If informants remembered new information, we asked them to tell us when during the care-seeking process, they had administered the

treatment. This "cueing" or "aided recall" has been shown to increase the *amount* of reported behavior (Cartwright 1959; Kroeger 1983b). It has not been shown specifically to reduce errors in recall. In this case, more recall seems better than less because, if patterns exist, they are likely to emerge from more data.

Some of the illness episodes informants described were not yet complete. In such ongoing illness cases we collected all the information about the illness and treatment to date in our first interview. The following week we returned and asked about any new signs, symptoms or treatments. We continued to do this until the illness episode finished or we determined that the illness was chronic. We defined chronic illnesses as those that lasted for more than three weeks, and we did not include these chronic illness episodes in our search for patterns of treatment. In the 5-month period we encountered only 5 chronic illnesses. In sum, we collected information on 454 non-chronic illness episodes from 88 compounds.

This longitudinal study provides an estimate of the village morbidity, as well as estimates of the use of different health care alternatives. Of course such descriptions are underestimates since we failed to examine chronic illness and we surely missed at least some acute illnesses in compounds.

Decision-making case studies

We selected particular illnesses episodes from the illness episode surveys and conducted more in-depth ethnographic interviews. (We limited our studies to cases of head, stomach, or chest illnesses.) We concentrated on the different stages of the decision-making process that the caretaker(s) underwent when choosing treatments. Although we attempted to elicit decision criteria, most of the interviews concentrated on

eliciting laypeople's perceptions of the illness episode during the stages of the decision-making process. We also paid special attention to the role social networks play in health care. Interview guidelines are found in Appendix A. We taped, translated, and captured 56 interviews.

Reliability of behavioral recall

We examined the issue of recall accuracy by selecting a random subset of illnesses episodes (N=53) and asking our informants to provide the same information they had given us 7 to 15 weeks previously. This was not merely a reliability check. We expected the answers to our second query to differ from those we received earlier. The data were collected to give us a better idea of how recall deteriorated over time and what errors we should expect.

Unobtrusive Measures of Behavior

We examined the official records from the hospital, health clinic, and private nurse during the time we were conducting research. The records provided information on the monthly counts of the number of patients and their medically diagnosed illnesses. Unfortunately, we could not tell whether those people who utilized these services were part of our sample or not.

Network Data

Network Generators

While conducting the treatment preference survey, we asked respondents if we could take their pictures. We promised to give each person a copy of their photo as compensation for participation. Of the 229 people who answered the preference questionnaire, 214 individuals (93%) allowed us to take photos. Some people refused because they felt that they weren't dressed properly, others didn't believe we would bring the pictures back, and others simply did not want to be photographed. Approximately six months later, we asked 184 (86%) of the same 214 people to look at all 214 pictures. Informants identified the people whom they recognized and described their relationships with those people. We wanted to know how "close" people were and how they were related by kinship, if at all.

To measure closeness, we asked informants to indicate whether they only greeted the person, talked about general topics, or talked about personal topics. We coded these as one, two, and three respectively. If the informant did not recognize the person in the picture, we coded the relationship as zero. This task gave us a measure of closeness on a 0 to 3 scale. We also recorded the informant's description of the kinship relationship as one of 20 local kinship terms (e.g., mother, father, cousin, uncle, etc). To avoid problems of fatigue, informants looked at the 214 pictures in two sessions. We recorded the data in two 184-by-184 people-by-people matrices. One matrix was based on the intimacy of

communication. The second matrix was based on the closeness of kinship relations among community members.

To convert the kinship categories into measures of closeness, the Kom anthropologist on our team, Mr. George Mbeh, evaluated the categories on three closeness scales: *emic*, *fixed,* and *medical*. As an expert on Kom kinship, he created an emic scale by sorting the terms into piles based on his own concept of closeness. He then identified six levels of proximity. The terms were assigned values of one to six where six represented the closest type of relationship. Mbeh created the fixed scale by rating each kinship terms on a scale from one to three where three represented the closest relationship with ego. Finally he created the medical scale by rating the terms from one to ten according to the degree that a person could expect to share medical knowledge with a person identified by each of the kinship terms. Table 3–2 shows that the emic and fixed scales are highly correlated (r=0.76). The medical scale is not strongly correlated with the other two scales since it represents an expert's opinion of how medical knowledge is passed among community members. In my analysis, I use the fixed scale to represent kinship closeness.

Descriptions of Networks

From the intimacy-of-communication matrix, we randomly selected a subsample of 95 people. We used nonmetric multidimensional scaling to depict the 95-by-95 similarity matrix in two dimensions. The two-dimensional plot showed how closely the 95 people were related to each other. Spacial proximity indicated social proximity. I laid pictures of the 95 people in the subsample on the floor in the same positions as indicated by the

MDS plot. I then asked two of my research assistants to tell me why certain people were close together and others far apart. Christina Musu and Jacenta Ngong performed the task. After having spent over eight months walking around the village talking to people, they can be considered social experts in the community.

I also conducted a cluster analysis on the same data and asked the same assistants to explain the groupings. I tape recorded their answers for both tasks. I had originally planned to repeat the process for the remaining people, and I had hoped to ask other key informants from the community to help in identifying social network patterns. Unfortunately, some people in the village erroneously associated the pictures with witchcraft and I felt it was better to put them away.

Physical Map of Village

We conducted a census of the village and identified 250 compounds. We mapped the location of each compound. During the mapping process, we paid particular attention to the proximity of each of our study compounds to each other. We were able to create a compound-by-compound adjacency matrix indicating which of the study compounds could be reached without passing through another compound.

Estimates of Network Size

To obtain another estimate of the informant's network size, we asked individuals (N=105) how many people they knew who: a) had twins; b) were admitted to the hospital or health center since January 1; and c) had various illness, including AIDS. Since we knew the answers or had good estimates, we hoped to be able to calculate how many

people they knew. See Killworth et al. (1995) for a review of efforts on estimating hard to count populations.

Living Arrangements

While in Wombong, my wife and I lived in the house of Dr. Paul Nkwi. Dr. Nkwi is a professor of anthropology at the University of Yaounde and in one of Kom elites. The house was centrally located in the Down Town quarter along the main road that runs through the village. We were fortunate to have running water and electricity. The building also served as the administrative headquarters for the Georgian City Academy, a private secondary school. One of the rooms also housed several of the school's computers. As part of my role in the community, I gave computer classes to the four upper levels twice a week.

During my stay in Wombong, several events interrupted our research. Jacenta Ngong, one of team's research assistants, and her entire family were accused of being witches. After several long and anxious days, the village council judged the family guilty. Family members were given a match to signify that they were not to enter any other compound, even to seek fire. Village members were also advised to avoid the accused essentially ostracizing the entire family. Since Jacenta was unable to conduct interviews and I was worried that accusations of witchcraft might affect the team's research, I was forced to terminate Jacenta's employment.

Also during my stay, the country held its first multiparty elections. Kom was a strong supporter of the main opposition candidate. When the ruling party declared itself

the winner, opposition members began to burn houses of ruling party members throughout the North West Province. Kom was the hardest hit. Over 100 compounds were destroyed, including those of some of my neighbors. A state of emergency was declared and all transport to and from the North West was restricted.

Since I had gone to the capital the day before the election, I found myself stuck in the city for three weeks. Despite numerous efforts, I was unable to get official documents to return to Kom. Eventually, I got back into Kom territory, where I found it very easy to get official permission to travel throughout the region. Bureaucratic formalities are more lenient in the countryside.

Table 3-1 Surveys and interviews completed.

Type of Data		Unit of	Sample Size: Male Literacy		Female Literacy		Total
Survey Name	Method	Analysis	Yes	No	Yes	No	
Socio/Demographic							
Personal	S	I	63	38	90	91	282
Compound Demographic	S	C	–	–	–	–	82
Compound Economic	S	C	–	–	–	–	108
Random Economic/Demo.	S	C	–	–	–	–	176
Knowledge							
Illnesses & illness categories							
Free lists of local terms	F	I	9		13		22
Translation of terms	E	I	4	–	2	–	6
Pile sorts of 36 terms	P	I	6	–	5	–	11
Ethnographic interviews	E	I	9	15	6	9	39
Severity scale (Likert)	S	I	9	9	24	14	56
Severity scale (magnitude)	S	I	13	5	22	10	50
Treatmen modalities							
Preferences	S	I	53	34	66	76	229
Triads Tests	T	I	12	1	8	2	23
Traditional healers/home remedies	S	I	43	30	66	61	200
Home remedies (sources)	S	I	23	13	34	24	94
Free lists of pharmaceuticals	F	I	7	3	6	7	23
Pharmaceutical uses	S	I	9	5	17	8	39
Ethnographic interviews	E	I	15		8		23
Behavior							
Reported management of illnesses	S	E	192		262		454
Decision-making case studies	E	E	11	10	28	15	64
Reliability of behavioral recall	S	E	20		33		53
Network							
Network generator	S	I	40	26	55	63	184
Network descriptions	FG	G	–	–	–	–	1
Physical map of Wombong	S	C	–	–	–	–	250
Estimates of network size	S	I	24	14	37	30	105

Methods: E=Ethnographic Interviews,F=Free list, FG=Focus Group, P=Pile Sorts, S=Survey, T=Triad Tests
Unit of Analysis: C=Compounds, E=Illness Episodes, G=Group, I=Individuals

Table 3–2 Pearson's product-moment correlations among kinship closeness scales (N=21).

	Emic	Fixed
Fixed	0.76	
Medical	-0.31	0.34

CHAPTER 4
KOM: THE LOCAL GEOGRAPHIC, CULTURAL, AND MEDICAL ENVIRONMENT

Wombong lies at the center of the Kom tribal region in the North West Province in the Anglophone zone of Cameroon. Laypeople in Wombong make medical choices based on the local medical options that are available to them. Below I briefly describe the national, provincial, tribal, and local medical environments.

Cameroon

European contact began in the 1500s and religious missions began to appear in the mid 1800s. In 1884, Germany annexed Cameroon. Germany maintained control over the colony until the beginning of World War I, when British and French armies invaded. In 1919, the United Kingdom and France signed a declaration in London dividing Cameroon between themselves. Under this declaration, the larger eastern section became French Cameroun and the smaller western section became British Cameroon.

The French and British maintained control over the territories until 1946 when the United Nations converted the French and British mandates into trusteeships. Until this time, British Cameroon was administered through "indirect rule" from Nigeria. In contrast, the French established and ran a centralized government in French Cameroun.

In 1958, the U.N. General Assembly voted to end the French Trusteeship and on January 1, 1960 French Cameroun achieved independence as the Republic of Cameroon. In 1961, the British held a plebiscite in British Cameroon to determine whether the people wished to join with Nigeria or with the new Republic of Cameroon. Two of the northern sections voted to join Nigeria while the southern section, including the Kom people, voted to join Cameroon. On October 1, 1961, the southern part of British Cameroon united with French Cameroun and the Federal Republic of Cameroon was born (Le Vine, V. 1971).

From 1961 to 1972, Cameroon was governed as a federation, with the East (former French) Cameroon and West (former British) Cameroon having individual governments. In 1972, then President Ahidjo proposed that the federation be disbanded. A referendum held on May 20, 1972 endorsed the proposal and on June 2, a decree declared the country the United Republic of Cameroon. In 1984, the National Assembly changed the nation's official name to simply the Republic of Cameroon.

Today, the Republic of Cameroon is divided into 10 provinces (Figure 4–1). Provincial governors are appointed directly by the president. Government ministries and programs are centralized and most are administered directly from Yaounde.

Formal and traditional structures exist side by side. Traditional kingdoms and organizations exercise various functions of government among tribal groups. Judicially, tribal laws are upheld as long as they do not conflict with national laws. Officially, formal governmental and tribal structures are supposed to be mutually reinforcing, while allowing for local variation based on tribal or regional customs. The formal and tribal

structures do, however, come in conflict, and in most cases the national government takes precedence.

Cameroon is linguistically diverse, with about 240 languages from three major African language families (the Niger-Cong, Afro-Asiatic and Nilo-Saharan). Roughly 75-80 % of Cameroon's population speak French, while 20-25% speak English. Cameroon Pidgin, however, is the most widely *spoken* language spoken in both Anglophone and Francophone zones (Krieger 1991). Cameroon, however, is the only country in Africa where both English and French are officially recognized in the constitution.

North West Province

North West Province is in the Anglophone zone of the country. Established by the Germans as an outpost, Bamenda is the hub of the region's administrative and economic activities. Bamenda is the point at which the region's major road transport system, the *Ring Road,* connects to the rest of the country. All information and commerce flows through Bamenda.

The North West Province is composed of numerous tribal kingdoms that make up the *Cameroonian Grassfields* (Figure 4–2). An abundance of historical and anthropological literature exists on the region. See Chilver and Kaberry (1967) and Nkwi and Warnier (1982) for reviews. Few studies of the region pertain directly to medical behaviors. Pool's (1994) work among nearby Oku-speakers is the most complete work. This study describes people's beliefs as they relate to kwashiorkor but offers little insight into laypeople's medical behaviors.

People from North West Province have a reputation for being outspoken. The province is also the seat of the opposition party. During the time of our research, Cameroon held its first multiparty presidential elections. When the ruling party declared themselves winners, mobs of people burned or otherwise destroyed the homes of ruling party members. The destruction was heaviest in the Kom tribal region. Over 100 homes were damaged or destroyed, including several in Wombong. The government imprisoned a large number of individuals from the area, including some of our informants. The entire North West Province was placed under a state of emergency from October to December 1992. Travel was restricted and curfews enforced, although our research team continued to collect data in the village.

The Kom Tribal Region

Kom is the third largest ethnic group in the North West. The Kom tribal region begins some 35 kilometers northwest of Bamenda and covers approximately 750 square kilometers (280 square miles). In the national system, Kom territory falls entirely within the newly formed Boyo district. Prior to 1993, Kom territory covered most of the Fundong subdivision of Mechum division. The town of Fundong was the subdistrict capital. In 1993, the subdivision was elevated to divisional status and renamed Boyo. The newly formed Boyo division has four subdistricts: Fundong, Njinikom, Belo, and Bum. Bum is the only subdistrict that is not covered by the Kom tribal territory. Fundong is the capital of the district. There are approximately 125,000 Kom-speakers in the region and 12,000 Fulani-speakers.

The area is mountainous (ranging from 800 to 1850 meters above sea level). Winters are cool and dry, while summers are warm and rainy. The area receives an average yearly rainfall of approximately 260 milliliters, making the harvesting of two crops possible. During the rainy season, the main road that runs through the division is sometimes impassable. Transport costs in and out of Kom during this time triple. Agriculture is the main economic activity. Maize, beans, potatoes, guinea-corn, yams, peanuts, and plantains are the staples and coffee is the principle export crop. Farm plots are small and are located on steep terrain. Because of the difficulty in transport, staples are not a major source of cash. Goats, sheep, and chickens are the main livestock for the Kom people. Any cattle are owned by Fulani herders.

The rainfall in the region feeds small streams and fills local wells. Some communities have potable water that residents can access through public taps. Other communities rely on water from fast flowing streams or from small seasonal springs. There is no sewage disposal in the area, although most compounds have their own latrines.

The Kom territory is divided geographically, economically, and socially into three valleys, Fundong, Njinikom, and Belo, named after their three largest towns (Figure 4–3). Historically, there has been a rift between Njinikom and Belo over religion. Njinikom was the site of one of the province's first Catholic missions. Belo has been a Protestant stronghold. Although Njinikom was originally the seat of the government of West Cameroon, the government seat moved to Fundong in 1973. Fundong has become the largest and most economically active town in the area.

The Kom People

The Kom are a matrilineal society. Kinship, descent, inheritance and succession are determined by the mother's line. Historically, Kom ancestry is traced through the Tikar who moved into the region in the last century (Chilver and Kaberry 1967; Nkwi 1969, 1976) The Kom people are united by a single language and a strong and traditional political structure. *Itaŋikom* is spoken by all residents. Pidgin is spoken next, followed by English. Nearly all Kom residents are multilinqual in *Itaŋikom*, Pidgin and English. Most Kom people are farmers.

The traditional governing system is headed by the *Foin* who resides at the palace in Laikom. The *Foin* presides over the ruling council (*Kwifoin*). The *Kwifoin* is the *Foin's* mouthpiece and has representatives (village heads) in every section of the kingdom. Village heads report irregularities directly to the *Kwifoin*. Each village is made up of sub-villages or quarters over which presides the *Bomteh* or quarter head. The quarter heads are members of the village council over which the village head presides. See Nkwi (1969, 1976, 1985, 1987, 1990) and Chilver and Kaberry (1967) for more information on Kom governing structures.

In 1913, German Fathers of the Sacred Hart of Jesus arrived in Kom. Foyn Ngam gave them a plot of land in Funja. The Fathers established a small mission where they tried to translate the catechism into the Kom language, and taught German (reading, writing, and speaking) and arithmetic. They also looked after the sick. The Fathers left Kom in 1915 after the defeat of the Germans by the British and French in World War I.

In 1920, catechists set up the first Christian community in Njinikom. After much struggle between Christians and Non-Christians, a parish was established in Njinikom in 1927. The Foyn gave permission for the Catholics to build churches and schools. Kom became a center for education in the region. In 1939, a vernacular school was opened in Njinikom with 296 boys and 21 girls. In 1944, the Teacher's Training College was opened in Njinikom. By 1945, there were 335 pupils in primary school, of whom 276 were Kom. The Teacher's Training College moved to Bambui in 1948. In 1959, the mission opened a girls school. A secondary school was established in Ashing (near Belo) in 1963. For a complete history of the Catholic Mission in Njinikom, see Nkwi (1977).

Wombong

Wombong, the site of our research, lies in the middle valley and is adjacent to the larger town of Njinikom. The village lies along the main road that runs through Kom territory. Wombong is approximately 60 kilometers from Bamenda, 26 kilometers from Mbingo, 16 kilometers from Belo, and 18 kilometers from Fundong.

The boundaries of Wombong are difficult to define. In the traditional system, Wombong consists of two quarters, Wombong Up and Wombong Down. Each quarter has its own *bomteh.* Wombong Down, the bigger of the two, is one of three quarters of the traditional village Fuanantui (other quarters include, Muloin, and Mughef Up). Wombong Up, however, falls under the traditional rule of Njinikom's village head.

Under the official system, Wombong's boundaries are even more confusing. As in the traditional system, Wombong is divided between the villages of Njinikom and

Fuanantui and is composed of quarters named Wombong Up and Wombong Down. In the official system, however, there are two quarters named Wombong Up. One quarter belongs to Njinikom village and the other belongs to Fuanantui. There is only one Wombong Down which belongs to Fuanantui.

Our study site (which from this point on I will refer to as Wombong), includes compounds that run across both official and traditional boundaries. I refer to the site as Wombong because local residents consider it as a single place. When asked where they come from, local residents normally respond, "Wombong." They respond, "Wombong Up" or "Wombong Down," (or some other neighborhood) only if they are asked "What part of Wombong are you from?"

Wombong, as we have defined it, roughly corresponds to the combined area of official Wombong Up that belongs to Njinikom and the official Wombong Down that belongs to Fuanantui. The official population estimate from 1992 for Wombong Up was 553 in 78 compounds. Wombong Down was estimated to have 959 people in 158 compounds. These estimates are based on projections from the 1987 national census. Table 4–1 shows the 1992 age and sex projections for both Wombong Up and Down.

We were unable to assess the official boundaries used in the government census for Wombong Up and Wombong Down. census. We asked informants to demarcate the boundaries of Wombong. There are probably discrepancies between our demarcation of Wombong (Up and Down) and the official boundaries of Wombong (Up and Down). After establishing what counted as Wombong, we counted and mapped 250 compounds in the village (14 more than official population estimates). We interviewed a random

sample of these 250 compounds (N=176, 70% of total village). On average, there were 6.4 (sd 3.5) people per compound. Extrapolating to all 250 compounds, this places Wombong's population at about 1600. Table 4–1 also shows the age and sex distribution according to our random sample.

The discrepancy between the official population estimates and our estimates may come from several sources. First, we used local definitions of what people considered Wombong. The government census may have drawn different boundaries. Second, we are not sure how or when the official census was actually taken in the area. Although the official numbers are what the census bureau has in its computers, we don't know from what source they came.

Wombong lies on the side of Mount Boyo, a 6500 foot high mountain. We divided the village into 6 different neighborhoods (Figure 4–4). The main road that runs through the entire Kom territory divides the town roughly in half. Down Town is the center of the village and lies on either side of the road. The coffee cooperative is located here, as are several small shops and bars. The quarter head's residence is also located in this region. Mile 36 lies along the road but is further down the hill. M-ibv-ika is located below Mile 36 and M-ilumbo is adjacent to it. Acha'ajua runs along both sides of the road above Down Town and before Njinikom. We treated Wombong Up as a separate quarter.

History of Medicine in Kom

Western medicine arrived in Kom with the missionaries. The first maternity house opened in Belo in 1945 as part of the Baptist mission. The Baptists established a leprosy

hospital in Mbingo in 1952. In 1964, this institution expanded to become a general hospital. In 1985, Mbingo had 82 beds, 56 in the general hospital unit, and 26 in the leprosy unit.

In 1953, a four-bed maternity ward was established in the Catholic region of Kom territory. In 1963, a 43-bed general hospital opened. By 1985 the maternity ward had expanded to 20 beds, handling 1000 deliveries, and the hospital had expanded to 120 beds, treating 20,000 outpatients and 3,000 inpatients that year (Mbeh 1988).

The Cameroon government operates a hospital in Fundong. The hospital is staffed by a single doctor and does not have operating or laboratory facilities. Government health clinics are also located in Fuanantui, and Anyajua, and a there is a Catholic dispensary at Ashing. Table 4–2 lists the Western medical facilities that are available in the or around the Kom territory.

Health Care Alternatives

Laypeople in Wombong have six medical resources available when they are confronted with an illness. People can obtain assistance from: home remedies (*home remedies*); pharmaceutical products (*pharmaceuticals*); numerous traditional healers (*traditional healers*); a private Catholic hospital (*hospital*); a government health clinic (*clinic*); a private nurse (*nurse*).

Two of the local resources are administered by laypeople rather than by medical specialists. These include, home remedies and the purchase of pharmaceutical drugs. Four of the treatment modalities were administered by medical professionals, and

included traditional healers, the government health clinic, the catholic mission hospital, and a private retired nurse.

Home Remedies

Home remedies included all treatments that were administered in the home by nonspecialists and that were not purchased at a local store. Most treatments consist of herbal remedies that compound members know. Laypeople administer herbal remedies in the forms of liquid, powder, salves, and compresses. These last can be applied hot or cold. In addition to herbal concoctions, home remedies can also include special bathing practices, hot compresses, and special foods such as burnt bananas.

Pharmaceuticals

Pharmaceuticals are readily available to laypeople from three sources: a) authorized dealers; b) local stores; or c) medical hawkers. Authorized dealers include the dispensaries of the local hospital, health clinic, and nurse. Pharmaceuticals obtained from these locations require a prescription from one of the resident health care providers. In contrast, pharmaceuticals purchased from stores and hawkers can be obtained by anyone.

There are 10 local stores in and around Wombong that distribute pharmaceuticals. They carry up to 29 different kinds of medicines. Table 4–3 lists the most common items, the number of stores where they are sold, and their average cost. Typically these remedies are antimalarials, antibiotics, or pills for reducing fever, alleviating pain, or eliminating worms. The most common drugs available include: aspirin, paracetamol, penicillin, chloroquine (and chloroquine-related products), tetracycline.

Laypeople who have past experience with particular illnesses often purchase medicines on their own. Others, who may be unsure of what to buy or how much to administer, seek assistance from whomever is working behind the store's counter. Store proprietors, particularly those who work in stores with larger inventories of medicines, often find themselves acting as unofficial doctors. When laypeople ask for recommendations, owners and clerks will diagnose the problem and prescribe dosages.

Unlike local establishments, medical hawkers are transient. We observed between five and eight at the local market that occurs in Njinikom every eight days. Occasionally, hawkers move along the main road during non-market days. Hawkers are usually non-Kom speakers and come from Bamenda, the provincial capital. Those few who are Kom tend to follow the market circuit and are not available all the time. Hawkers almost always have more wares to sell than are available at the local establishments. They include everything from cold medications, to birth control pills, to injectable penicillin.

Traditional Healers

Defining who is a traditional healer in Kom is difficult because Kom traditional medicine does not have a strong "professional" component. There does not appear to be any complete or coherent body of knowledge that can be labeled "Kom". In many ways, Kom traditional medical knowledge is similar to the system described by Murray Last in Nigeria. Murray suggests that,

> the origin of 'not-knowing' lies in the break-up of traditional medicine; and from this not-knowing there has developed first, a crecey which tries to conceal the lack of knowledge and certainty; and second, a septicism in which people suspect that no one really 'knows', that there is no system. But the social conventions of politeness– as well as people's real need to

> find a cure for their ills–keep the veils of secrecy and scepticism sufficiently in place, for themselves and for others. Thus, visitors, on the look-out for systems, are easily misled (Last 1981:391).

Like Murray's example, healers in Kom tend to be secretive about their medicinal knowledge. Although they claim to have learned from a host of relatives, rarely was the knowledge passed down from a single person. Recently a professional organization of traditional healers formed in Fundong, 13 kilometers away.

We generated a list of healers from our survey of lay knowledge of traditional healers. We asked 201 Wombong residents to identify people whom they knew could cure any of 31 illnesses. We allowed the respondents to tell us whether a person who administered the treatment was considered a traditional healer (*wul afili*) by people in Kom. From their answers, we generated a list of 105 healers. Table 4–4 shows the distribution of healers by location and sex. Approximately 30% (n=32) were from Wombong. The remainder came from Njinikom and other neighboring villages. Of those from Wombong, 69% were men. Of those from outside Wombong 89% (65 out of 73) were men. This suggests that male healers may have bigger reputations than do female healers.

We interviewed 26 healers from Wombong, (81% of those identified in the village), about what illnesses they could treat and from whom they had acquired their knowledge. On average healers reported that they could treat 42.5 % of our 31 illnesses. Table 4–5 shows the illnesses that Wombong healers claim to treat. The most popular illnesses are listed first.

Some of the healers we interviewed had been in the village all their lives. Others had recently moved to Kom. Most of the traditional healers are herbalists, though some practiced divination as well. Some claim only to cure a few illnesses, while other claim to know how to cure many more. Some only see a few patients, usually relatives and close friends, while others have developed a much broader reputation.

Clinic

The government-sponsored health clinic is located on the lower side of Wombong. The clinic was opened in 1983 and is managed by a health board made up of local people. It is staffed by several nurses and midwives who receive their salaries from the government. While we were conducting research, salaries were several months late. The clinic is overseen by a doctor who lives in Fundong 18 miles away. The doctor rarely appears as he is not given money for gas. The clinic has 6 beds, mainly for maternity patients. They do not have the facilities to test for malaria. All severe cases are immediately referred to the hospital.

Most patients who attend the clinic come for vaccinations and non-threatening illnesses. Table 4–6 shows the number of patients seen between January, 1992 and April, 1993 for the top ten causes of morbidity. The clinic also dispenses pharmaceutical products. Prices are fixed and subsidized by the Cameroon government. They are usually cheaper than those found in local stores and guaranteed not to have expired.

Nurse

A retired nurse, Barnabas Njingo (known locally as Pa Njingo), returned to Kom after having worked outside the area for over 30 years. Pa Njingo was one of the first local nurses from the North West to be trained. At the time the area belonged to Nigeria.

In 1987, Pa Njingo retired and returned to Kom. He established a small private practice in his home which is located in the center of Down Town. Early each morning, Pa usually receives a small number of patients. Pa purchases his own pharmaceuticals in bulk from Bamenda. He then brings them back and sells them at a profit. In addition to being a medical specialists, he is a well know figure in town and was active in the opposition movement going on at the time. For two months during our research, Pa was in prison allegedly for inciting political riots.

Since March 1990, Pa has kept records of the patients he has seen, their diagnosis, and the cost of their treatment. Table 4–7 shows the number of patients received, and their diagnosed illnesses. Since he opened, Pa has recorded working with 1041 patients, about one a day. Although Pa Njingo allowed us to copy all his records, I am sure those records produce an undercount of his practice. On many occasions, I saw him treat patients without writing down the diagnosis or charging them.

Hospital

The closest hospital is a private Catholic institution in Njinikom. For most residents it is roughly a 30 minute walk from Wombong. The hospital attracts patients from all over the region, including the Fulani herders in the Fundong area.

The hospital has 150 beds. These include: maternity ward (30); surgical ward (40); medical ward (50); and children's ward (30). The hospital operates a surgical theater, a laboratory, a dispensary, an eye clinic, a dental clinic, and a maternity ward. It also conducts vaccination campaigns. The hospital is the best equipped and staffed institution within 30 kilometers. Although there is a government hospital in Fundong, 17 kilometers away, the facilities are not as extensive as those offered at Njinikom. The nearest hospital that has a similar capacity is the Baptist hospital located in Mbingo an hour's drive from Njinikom.

Table 4–8 shows the composition of the Njinikom hospital staff. There are currently two doctors in residence. Both are from outside Cameroon. One is from Nigeria, and the other is from the United States and has recently been transferred from Shishong Hospital in the Kumbo territory. Doctors normally stay for 3-to-5 year stints. The hospital director is a Franciscan Sister from Germany. She is a registered nurse.

The hospital is having financial difficulties. At the end of the 1991/92 fiscal year, the hospital had accumulated over 4.5 million CFA ($15,000) unpaid bills. With the economic depression, people do not have money to pay for hospital services. It is hospital policy not to allow patients to go home unless they have paid their hospital bills. The 1991/92 hospital report notes, however, that "Some patients abide by these rules, others just escape." To stem the deficit, hospital workers agreed to take a 15% salary cut for the 1991/92 fiscal year.

The hospital has both outpatient and inpatient sections. Table 4–9 shows the numbers of patients in the different services. The outpatient unit is underutilized; the

waiting room outside is often nearly empty. The steep drop in utilization for the 1991-1992 fiscal year is in part due to a confrontation that took place between locals and the hospital administration in July of 1991. For reasons that are not entirely clear, a mob of angry people approached the hospital. The non-Kom hospital staff, including the doctors, left Njinikom until the situation returned to normal. During July and August, the staff that remained only saw outpatients. All serious cases were referred to the Baptist hospital in Mbingo.

Table 4–10 shows the utilization rates of the inpatient services from July 1989 through June 1992. This table also shows the average number of beds used in each of the hospital wards for fiscal year 1992/1992. Table 4–11 shows the illnesses that the hospital saw during this period. Table 4–11 also shows the top ten causes of morbidity for adults and children as diagnosed by the hospital staff. Table 4–12 shows the offical government mordidity statistics kept at the Njinkom hospital from July, 1992 through April, 1993.

The Njinikom hospital also supervises four community health posts. Three of these posts (Achain, Elung, and Konene) are supposed to be supervised by Fundong Subdivision Hospital. The fourth (Mbesa) is supposed to be covered by the Anyajua Health Center. Since the doctor at Fundong, and the Chief-of-Post of Anyajua do not have transport they asked the hospital to continue to supervise these posts. Hospital personnel make monthly visits, usually to administer vaccinations.

Compared to the clinic and Pa Njingo, the hospital sees more serious illnesses. From the records of the clinic, nurse, and hospital, the most common ailments are malaria and ordinary air-born illnesses, like colds, flu, and bronchitis. Water-born illness are

uncommon, probably due to the relatively clean water supply. The water is collected high up in the valley, and is piped down to the village after being chlorinated. Although most residents do not have running water in their homes, common taps are available in each neighborhood.

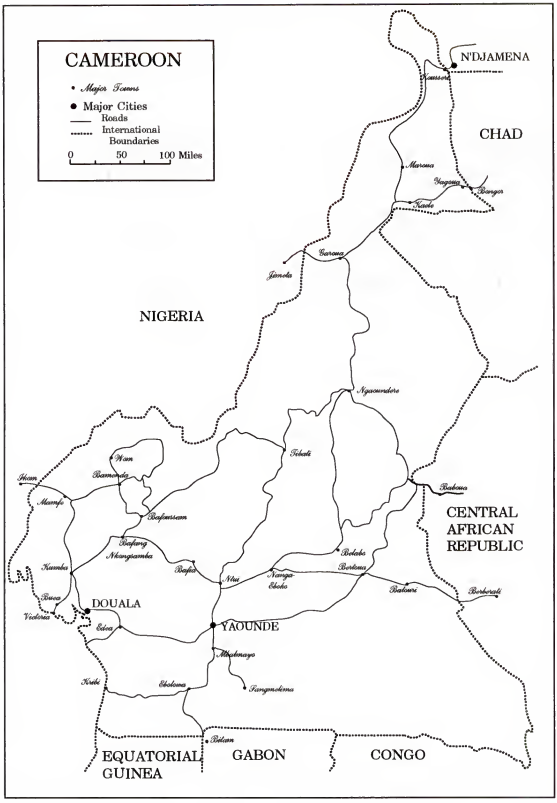


Figure 4–1 Map of Cameroon.

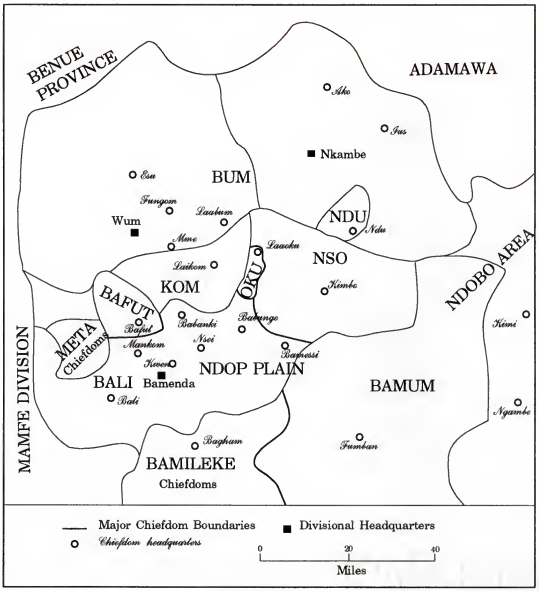


Figure 4–2 Ethnic regions of the Cameroonian Grassfields.

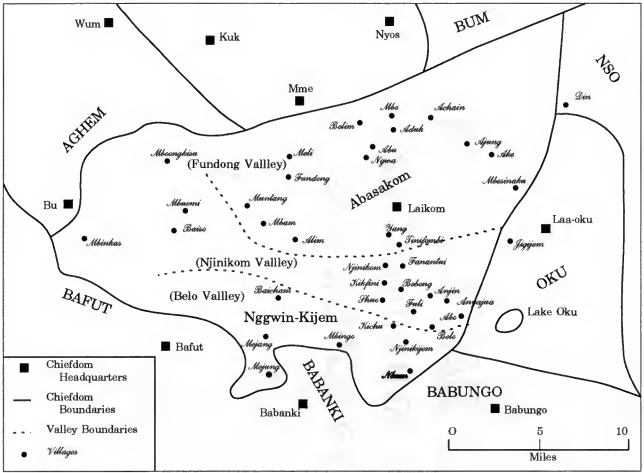


Figure 4–3 Map of major valleys and villages in Kom.

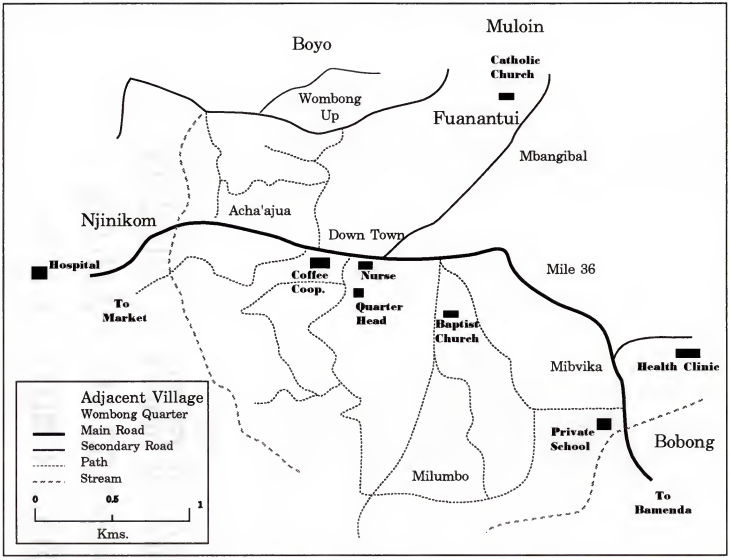


Figure 4–4 Map of Wombong and adjacent villages.

Table 4–1 Population projections by age and sex for Wombong based on official 1987 census and a demographic survey of randomly selected compounds (N=178).

	Compounds	Gender				Age				
		Male		Female						
Source		Freq.	%	Freq.	%	0–5	6–14	15–64	65+	Total
Official census										
Wombong Up	78	251	45.4	302	54.6	103	167	261	22	553
Wombong Down	158	459	47.9	500	52.1	196	243	478	42	959
Total	236	710	47.0	802	53.0	299	410	739	64	1512
								Age†		
Demographic Survey						0–4	5–15	16–50	51+	Total
Survey (N=178)	178	512	45.6	611	54.4	151	380	383	209	1123
Village projection	250	719	45.6	858	54.4	212	534	538	293	1577

†Categories are different from those used in official census.

Table 4–2 Western medical institutions in region.

Type of Institution	Location	Distance (km)	Number	Highest level of staff training
Governmental				
General Hospital	Wom	72	1	Doctor
Subdivision Hospital	Fundong	18	1	Doctor
Health Centers	Fuanantui	1	1	Nurse
	Bafmeng	27	1	Nurse
	Anyajua	10	1	Nurse
Denominational				
Baptist Mission Hospital	Mbingo	28	1	Doctor
Catholic Mission Hospital	Njinikom	2	1	Doctor
Baptist Health Center	Belo	16	1	Nurse
Presbyterian Health Center	Weh	60	1	Nurse
Primary Health Care Post	Various Locations	–	25	Health Worker

Table 4–3 Availability of most common pharmaceutical products and their average costs in local stores, and cost at health center.

	Availability		Average Cost (CFA)	
Pharmaceutical Product	# of stores	% of stores	Stores	Health Center
Paracetamol	9	90	5 / 500 mg	10 / unit
Phensic	8	80	10 / 300 mg	–
Chloroquine	8	80	10 / 100 mg	10 / 100 mg
Aspirin	7	70	10 / 500 mg	10 / 500 mg
Multiple Vitamins	6	60	10 / unit	10 / unit
Endometacine	6	60	10 / 25 mg	–
Oxitetracycline	6	60	25 / 250 mg	–
Penecillin	5	50	50 / 500 mg	–
Ampecillin	5	50	50 / 500 mg	30 / unit
Sulphadimidine (760, M&B)	4	40	20 / 500 mg	–
Ephadrine	4	40	10 / 60 mg	–
Phenylbutazone	4	40	10 / 100 mg	–
Tetracycline	4	40	10 / 250 mg	30 / unit
Phansidar	4	40	150 / 500 mg	–
Nivaquine	4	40	10 / 100 mg	–
Flagyl	4	40	25 / 250 mg	–
Bonacide	4	40	10 / 50 mg	–
Atomic Rub	4	40	25 / tin	–
Panadole	3	30	15 / 500 mg	–
Bactrim	3	30	25 / 500 mg	30 / unit
Laxative	3	30	50 / unit	–
Levamisole (katex)	3	30	10 / 40 mg	–
Quinimax	2	30	50 / 100 mg	30 / unit
Raglo	2	20	30 / 5 mg	–
Small-No-Be-Sick (essent)	2	20	40 / tin	–

Table 4–4 Distribution of recognized healers by village location and sex.

Location	Males		Females		Total	
	Freq	%	Freq	%	Freq.	%
Wombong	22	68.8	10	31.2	32	30.5
Adjacent Villages	35	89.7	4	10.3	39	37.1
Nonadjacent Villages	30	88.2	4	11.8	34	32.4
Total	87	82.9	18	17.1	105	100

Table 4–5 Percentages of Wombong healers who report curing each of 31 illnesses (N-26).

Illness	Gender		Education		Total
	Males (n=18)	Females (n=8)	Literate (n=12)	Iliterate (n=13)	
Akesi (cough)	94.4	87.5	91.7	100.0	92.3
Ɨlva cho'nɨ (diarrhea)	83.3	75.0	83.3	84.6	80.8
Ɨlva yafɨnɨ (stomach ache)	77.8	62.5	75.0	76.9	73.1
Afo a woynda (side pain)	66.7	37.5	50.0	69.2	57.7
Ɨchfɨ ɨ fɨdwo' (gastric)	72.2	37.5	58.3	69.2	61.5
Mɨnji (gonnorhea)	55.6	37.5	33.3	69.2	50.0
Atu (headache)	83.3	50.0	83.3	69.2	73.1
Ighasaghasa (ring worm)	55.6	75.0	66.7	61.5	61.5
Ɨjem i yafɨnɨ (back pain)	50.0	37.5	41.7	53.9	46.2
Agvɨɨl (fever)	50.0	62.5	58.3	53.9	53.9
Mbvɨtɨ (measles)	55.6	62.5	66.7	53.9	57.7
Tɨghŋawoŋ (worms)	33.3	14.3	0.0	53.9	28.0
Isoŋ i yafɨna (toothache)	58.8	50.0	66.7	50.0	56.0
Ayus (itch)	55.6	12.5	41.7	46.2	42.3
Atu a chwotinaɨ (high	50.0	12.5	33.3	46.2	38.5
Akes azwena (asthma)	44.4	50.0	50.0	46.2	46.2
Nkaysɨ (scabies)	44.4	37.5	41.7	46.2	42.3
Nka' (psoriasis)	33.3	62.5	41.7	46.2	42.3
Alvɨ a yafɨna (knee pain)	38.9	37.5	41.7	38.5	38.5
Mɨmɨ (boils)	38.9	37.5	41.7	38.5	38.5
Atuŋlɨ a yafina (ear pain)	27.8	50.0	33.3	38.5	34.6S
Asɨ a yafɨna (eye pain)	38.9	37.5	41.7	38.5	38.5
Ise (rash)	27.8	25.0	25.0	30.8	26.9
Ɨyuŋ (joint ache)	33.3	50.0	50.0	30.8	38.5
Agvɨl ato (high fever)	50.0	25.0	50.0	30.8	42.3
Ngwosɨ (cancer)	22.2	12.5	16.7	23.1	19.2
Angvɨ (epilepsy)	11.1	0.0	0.0	15.4	7.7
Ɨvɨmuytɨnɨ (swollen feet)	22.2	12.5	25.0	15.4	19.2
Ija' (madness)	11.1	0.0	8.3	7.7	7.7
Ise' (goiter)	11.1	0.0	8.3	7.7	7.7
Ansasi (leprosy)	5.6	0.0	8.3	0.0	3.9
Average # of 31 illnesses reported to cure (N=26)	14.0	11.5	13.3	14.1	13.2

Table 4–6 Government morbidity statistics for Funauntui health center from January, 1992 to April 1993.

	Gender		Age		
Diagnosed Disease	Males	Females	Adult	Child	Total
Malaria	245	273	248	270	518
Other not specified diseases	87	159	146	100	246
Intestinal Herlminthiasis	96	141	119	118	237
Broncho-pneumonia (Bronchitis)	69	82	47	104	151
Trichomonas	2	100	100	2	102
Gonoccocal infections (gono+)	19	74	90	3	93
Diarrhea	39	51	37	53	90
Anemia	42	43	27	58	85
Fractures/sprain/disloc.	49	28	51	26	77
Rhumatism	28	48	74	2	76
Syphilis	3	58	61	0	61
Unspecific Dysentery	17	21	25	13	38
Amoebiasis	18	17	22	13	35
Preg. Complications	0	32	32	0	32
Conjonctivitis	14	16	16	14	30
Diseases of skin	10	14	13	11	24
filariasis (loa-loa)	12	9	19	2	21
Pneumonia	11	10	6	15	21
filariasis (wucher.Bancroft)	11	9	14	6	20
Diseases of oral cav.	8	7	7	8	15
Chicken Pox	7	8	7	8	15
Other Diarrheas	5	10	2	13	15
Gastritis	3	11	14	0	14
Goitre	0	11	7	4	11
Ophtamia neonatarum	4	5	0	9	9
Measles	2	7	0	9	9
Otitis and dis. of ears	3	5	6	2	8
Appendicitis	1	4	5	0	5
Epilepsy	1	4	2	3	5
Gonoccocal infections (uncon)	0	5	5	0	5
Burns	1	2	1	2	3
Onchocerciasis	1	2	2	1	3
Intestinal occlusion & hernia	1	1	2	0	2
Intoxication	0	2	1	1	2
Tuberculosis	0	2	2	0	2
Venomous bites	1	0	0	1	1
Icterus-Jauvidice	1	0	0	1	1
Abortion	0	1	1	0	1
Cold-influenza Angina	0	1	1	0	1

Table 4–7 Diagnosis of patients seen by private nurse between March, 1990 and April 1993 (N=1041).

Diagnosed Illness	Frequency	%
Malaria	317	30.5
Bronchitis	95	9.1
Accident	55	5.3
Other	54	5.2
Arthritis	44	4.2
Salpingitis	41	3.9
Gonnoccocal infections	41	3.9
Gastritis	37	3.6
Broncho-pneumonia	27	2.6
Ear-related illnesses	25	2.4
Gastro enteritis	24	2.3
Abscess	23	2.2
Infection	19	1.8
Missing	19	1.8
Diarrhea	18	1.7
Filaria	17	1.6
Other digestive illnesses	17	1.6
Eye-related illnesses	15	1.4
Pneumonia	14	1.3
Onchoceriasis	14	1.3
Other respiratory illnesses	12	1.2
Hypertension	12	1.2
Rheumatism	12	1.2
Skin-related illnesses	12	1.2
Vaginitis	10	1.0
Toothache	10	1.0
Sexually trasmitted diseases	10	1.0
Dysentery	9	0.9
Tonsilitis	9	0.9
Other reproductive or urinary illnesses	8	0.8
Headache	7	0.7
Typhoid	7	0.7
Palpitations	7	0.7

Table 4–8 Hospital personnel from 1989–1992.

Occupation	Year (July - June)		
	1989/90	1990/91	1991/92
Doctors	2	2	2
State Registered Nurse	2	3	1
Midwives	2	2	2
Nurse/Midwives	3	3	2
Nurse Anaesthetist Ass.	-	-	1
Brevete Nurses	3	4	4
Community Specialist	1	1	1
Laboratory Assistant	1	1	1
X-Ray assistant	1	1	1
Nursing Aiders	13	11	14
Ward Auxiliaries	18	18	17
Domestic Servants	3	3	3
Secretary	1	1	1
Mechanic/Driver	1	1	2
Laundry men	2	2	2
Translator	1	1	1
Laborer	1	1	1
Bricklayer	1	1	1
Carpenter	1	1	1

Source: (Kaufhold and Quaye 1992:9).

Table 4–9 Hospital utilization, 1989 – 1993.

Hospital Utilization		Year 1989/90	1990/91	1991/92	1992/93
Out-Patients	Consultants	3683	3542	2974	2381
	Consultations	10138	10201	8695	5459
Ante-Natal	Consultants	3665	797	553	568
	Consultations	8590	3235	2093	2342
Deliveries		689	740	654	407
Child Welfare	Consultants	1553	1450	1672	–
	Consultations	7953	7157	4916	–
Vaccinations	DPT	1108	778	2715	2035
	BCG	1190	1233	920	708
	Polio	781	788	3515	2803
	Measles	738	716	702	525
	ATT	987	282	1107	548
Surgery	Minor Opers.	540	581	555	–
	Major Opers.	278	322	287	–
Eye Clinic	Consultants	194	190	213	–
	Consultations	224	308	263	–
X-Ray		346	427	324	–
Dental Clinic		427	705	365	–

Source: (Kaufhold and Quaye 1992:14).

Table 4–10 Hospital in-patient services, 1989 – 1992.

General in-patient services

	Year		
Statisitics	1989/90	1990/91	1991/92
Bed Capacity†	100	100	120
Occupancy Rate (%)	55	50	54
Hospital Admissions	1955	1902	1636
Hospital Days	21913	27270	26136
Average Stay (days)	11	13	18
Turnover Interval (days)	10	1	15
Deaths	53	49	56
Mortality Rate (%)	2	2.5	3.1

Average number of beds used per day (1991/92)

Ward	Total Beds	Maximum	Minimum	Average
Maternity	30	18 (60%)	5 (17%)	14 (47%)
Surgical	40	42 (105%)	7 (18%)	25 (63%)
Medical	50	46 (92%)	3 (6%)	27 (54%)
Children	30	41 (137%)	2 (7%)	13 (43%)
Total	150	135 (90%)	60 (40%)	79 (53%)

†Does not include maternity ward.
Source: (Kaufhold and Quaye 1992:15).

Table 4–11 Hospital out-patient morbidity statistics from July, 1991 to June, 1992.

		Rank of Most Frequent Illness	
Illness	Frequency	Adults	Children
Malaria	1052	1	1
Miscellaneous	885		
Genito-Urinary Tract Infections	774	2	
Medical Check-up	726		
Upper Respiratory Tract Infections	550	3	2
Muscle and Skeletal Pain	459	4	
Anaemia	437	5	3
Pregnancy Check-up	435		
Helminthiasis	433	6	7
Epigastric Pains	390	7	
Skin Diseases	380	8	4
Sexually Transmitted Diseases	369	9	
Hypertension	221	10	
Gastro-enteritis	201		6
Fractures/Sprains/Other Trauma	194		
Menstrual Disorders	150		
Onchocerciasis	128		
Post-operative Check-up	103		
Diabetes Mellitus	102		
Chronic Respiratory Diseases	102		
Mental/Psychosomatic Disorders	95		
Ear Diseases	93		5
Protein -Caloric Malnutrition	75		8
Dysentery	75		
Seizure disorders	57		9
Cardio-Vascular Diseases	50		
Goiter	45		
Sickle Cell Disease	38		
Infertility	35		
Tuberculosis	31		
Malignancies	4		

Source: (Kaufhold and Quaye 1992:12, 13).

Table 4–12 Government morbidity statistics for Njinikom hospital from July, 1992 to April, 1993.

	Gender		Age		
Disease	M	F	Children	Adults	Total
Other not specified diseases	305	275	165	415	580
Malaria	185	179	152	212	364
Preg. Complications	0	270	6	264	270
Gonoccocal infections (uncon)	50	142	5	187	192
Cold-influenza Angina	84	87	86	85	171
Fractures/sprain/disloc.	81	31	45	67	112
Diseases of skin	46	47	36	57	93
Broncho-pneumonia	44	45	44	45	89
Intestinal Herlminthiasis	46	38	34	50	84
Intestinal occlusion & hernia	50	28	14	64	78
Hypertension	54	23	0	77	77
Diabetes	53	17	3	67	70
Mental Disorders	25	44	2	67	69
Anemia	31	37	43	25	68
Pneumonia	27	16	18	25	43
Rhumatism	26	15	2	39	41
Diseases of oral cav.	17	20	4	33	37
Appendicitis	13	17	9	21	30
Filariasis (loa-loa)	10	18	3	25	28
Abortion	0	28	0	28	28
Conjonctivitis	15	9	10	14	24
Amoebiasis	17	7	1	23	24
Diarrhea	11	12	14	9	23
Gonoccocal infections (gono+)	12	10	1	21	22
Other Diarrheas	10	9	8	11	19
Otitis and dis. of ears	9	10	8	11	19
Goitre	7	11	3	15	18
Epilepsy	8	9	15	2	17
Venomous bites	7	9	5	11	16
Tuberculosis	10	5	0	15	15
Onchocerciasis	10	4	1	13	14
Burns	3	8	4	7	11
Syphilis	5	5	1	9	10

Table 4–12 Continued.

DISEASE	Gender		Age		Total
	M	F	Children	Adults	
Measles	6	3	8	1	9
Ophtamia neonatarum	4	5	3	6	9
filariasis (wucher.Bancroft)	6	3	0	9	9
Kwashiokor	4	4	7	1	8
Unspecific Dysentery	6	1	1	6	7
Sickle cell diseases	4	2	5	1	6
Meningitis	2	2	3	1	4
Poisonings	2	1	3	0	3
Intoxication	1	2	1	2	3
Trachoma	1	2	1	2	3
Icterus-Jauvidice	2	1	0	3	3
Tetanus	2	1	0	3	3
Tetanus neonatal	0	2	2	0	2
Intestinal bilharziosis	0	2	0	2	2
Chicken Pox	0	1	0	1	1
Typhoid Fever	1	0	0	1	1
Ankilostomiase	0	0	0	0	0
Antharax	0	0	0	0	0
Cholera	0	0	0	0	0
Diptheria	0	0	0	0	0
Drocontiasis	0	0	0	0	0
Lecshmaniosis	0	0	0	0	0
Leprosy	0	0	0	0	0
Maladie eruptive varioliforme	0	0	0	0	0
Plague	0	0	0	0	0
Poliomyelitis	0	0	0	0	0
Rabies Human	0	0	0	0	0
SIDA	0	0	0	0	0
Trypanesemiesis	0	0	0	0	0
Vesical bilharziosis	0	0	0	0	0
Whooping Cough	0	0	0	0	0
Yaws	0	0	0	0	0
Yellow Fever	0	0	0	0	0

CHAPTER 5
KOM: WHAT DO PEOPLE KNOW?

People in Kom share a general understanding of medicine. Some people, however, know a lot about illnesses and their treatments while others know much less. In this chapter, I ask three questions: 1) Who knows what about illnesses and treatments?; 2) How much do people know?; 3) How similar are people in their knowledge, particularly across age, sex, and education categories? I want to explain how knowledge is distributed across age, sex and education categories. In the first part of the chapter, I draw distinctions among different kinds of knowledge and addresses how knowledge can be measured and compared across individuals. In the second part, I build on these distinctions to better describe who knows what in Kom about medicine.

Kinds of Knowledge

At its base, knowledge is an adaptive mechanism that allows humans to more efficiently guide behavior by learning from past, as well as group, experience. Erasmus (1961) argues that people at all levels of development create predictive interpretations of the world based on their observations of repeated events. In fact, he suggests that this is the dominant cognitive aspect of human action. Experience and observation is the raw material from which knowledge is inductively derived.

Like Erasmus, I use knowledge in its broadest sense. Knowledge includes both facts about the world that are grounded in a physical and objective reality *and* "cultural" knowledge that is constructed out of people's perceptions of their environment. I won't enter into the philosophical debate between knowledge and beliefs but lump them under the same term.

Knowledge, like social structure, is a difficult construct to describe, measure, and compare across individuals, pairs of individuals, and communities. People, as individuals, experience the world in a unique manner. As community members, however, people share many of the same experiences. The result is a complex mixture of inter- and intra-group consensus *and* variation of all types of knowledge.

To understand the distribution of knowledge in a community, we must compare people's knowledge. Knowledge comparisons are based on two measures: a) *what* people know, and b) *how much* people know. The latter depends on the former.

What do People Know?

People know different things, and they know them in different ways. What people know refers to the *objects* of knowledge—the domains of knowledge. How people know refers to the *means* of knowing—the epistemology of knowledge. Consider the example of Martha and John:

> Martha and John share a lot of knowledge but they also know a lot of different things. Both have a strong command of the English language, both are interested in sports, particularly baseball, both know a bit about medicine, and both actively participate in political discussions. Martha, however, has a lot of knowledge about engineering while John knows hardly anything in this domain. John, on the other hand, knows a great deal about horses while Martha knows little.

How do we compare the degree to which Martha and John share the same knowledge? Obviously, part of the answer depends on *what* knowledge we want to compare. Are we comparing their knowledge across domains or within a specific domain? If we want to understand how social structure affects knowledge, we need to be specific as to whether we are talking about inter- or intra domain-specific knowledge. The inclusiveness and exclusiveness of domains is yet to be defined. It is beyond the scope of this dissertation to define them formally.

Now consider Martha's and John's knowledge of the medical domain.

> John and Martha both know a lot of illnesses that they find in their community. They more or less agree that certain signs and symptoms are associated with particular illnesses. They differ, however, in which treatment they think is the most efficacious for each illness. Martha knows of long list of traditional plants that are good for curing while John only knows a few plants. John, however, knows of more pharmaceutical drugs than Martha. Martha and John complement each other in their medical knowledge. Both John and Martha know how to treat children with high fever. Martha knows how to mend broken bones, while John knows how to stitch up superficial wounds.

How do we compare Martha's and John's medical knowledge? Obviously, there are specialized subdomains within the larger domain of medicine—for example, herbal versus pharmaceutical knowledge. Looking closely, however, we see that there are also different *types* of knowledge. Martha and John know similar *facts* about signs and illnesses; they hold different *opinions* about treatment efficacy; they know of the *existence of* different remedies; and they complement each other's medical *skills*. If we want to understand how social structure affects knowledge, we also need to be consider what *type* of knowledge we are taking about.

I divide knowledge into *knowing that, knowing of, knowing which,* and *knowing how.* By drawing such distinctions, we can better compare Martha and John on what and how much they know. Table 5–1 outlines the different types of knowledge. These types are neither exclusive nor exhaustive.

Consensual and Esoteric Knowledge

Some types of knowledge are easier to acquire and are shared by most members of a society. This is consensual knowledge. Other types of knowledge are harder to acquire and are less shared among only a few society members. This is esoteric knowledge. In most domains, people (even people with little exposure and familiarity with the domain) have at least a base-line level of knowledge.

How Much Do People Know?

In addition to comparing *what* people, dyads, and communities know, we can compare how much they know. Amounts of knowledge have been typically been measured as accumulation or as cultural competence. I restrict my definition to knowledge related to domains and ignore knowledge as measures of intelligence.

Accumulative knowledge considers the number of items that people know in a single or multiple set of domains. Measures of knowledge follow designs provided in test theory (see Batchelder & Romney 1986). Researchers test people's knowledge based on a sample of facts taken from a specific domain. Multiple choice exams are good examples of knowledge as accumulation. A person who scores 65 out of 100 is considered similar to a person who scores 63 out of 100, even if they only get 40 of the same questions right.

Cultural competence is another measure of how much a person knows in a specific domain. Cultural competence is derived from consensus theory (Romney, Weller & Batchelder 1986). Consensus analysis is designed to measure how much people know about a domain when there is no *a priori* answer key. The theory is based on the observation that people who agree with each other the most know the most things. Boster (1986) found that Aguaruna women who knew more classifications for manioc also agreed more with each other. Garro (1986) found that healers who knew more facts about traditional medicine agreed more among themselves than did laypeople.

Consensus analysis is based on three assumptions: a) informants must share the same common culture; b) individuals give answers to the questions independently of each other; and c) the test questions must come for the same domain and be more or less of the same difficulty level. If these assumptions hold, then the theory assesses all the answers to the questionnaire and derives the *culturally correct* answer key by giving more weight to members who agree most with other members. Each person's cultural competence is then derived in relation to the newly created answer key.

Kom Medical Knowledge

In this section, I examine what Wombong people think about illnesses and treatments. I describe the general explanatory model for Kom illnesses and treatments using data from free lists, pile sorts, magnitude scaling, triad tests, pile sorts and ethnographic interviews. I then examine the intracultural variation among knowledge of

treatments. In this study I only examine three types of knowledge–*knowing how, knowing of,* and *knowing which*.

What Do People Think About Illnesses?

In Kom, illnesses are alive and animated. They grow, they move, they eat (*chop* in Pidgin), and they have likes and dislikes. People do not "have an illness" but rather the illness catches, holds, or comes to them. Illnesses come to people in one of three manners: illnesses come as a result of the natural breakdown of the body or over work; people who make social transgressions attract illnesses to themselves; or evil people can send an illness to another person. As a Kom man put it,

> So you see, . . . if you have a illness which is known to be of the normal, that it is normal that your body should kind of wear out as you lead through life. OK, then [for] that kind of illness, you just take medicine it will finish. But there is this other kind that . . . if you fail to do something, some social thing, then by not doing it, you are attracting some misfortune to yourself. Or you yourself can attract it by doing something evil, by stealing for example. If you go and steal and *chusa* catches you, . . . then you have attracted illness to yourself by yourself. And you'll need to meet the person who kept the *chusa* to give you the medicine against it. And then there is that other category which is send by someone. Maybe he is just jealous of you that you are progressing in life.

Wombong people express contagion as an illness "crossing" from one person to another, or as one illness "bringing" another illness. Crossing can refer to an illness moving into a person, or it can refer to an illnesses transforming itself into different signs and symptoms within a person's body. For example, a young man complained to his grandmother that he had "not been feeling fine . . . feeling like I would have fever but not having it and so on." She responded, "Well, when you were born, you had a certain health

problem. And I am sure that it is just that sickness or illness that you had that is crossing in your body."

The fact that illnesses can manifest themselves in different forms often makes it difficult to diagnose an illness. As an informant explains,

> If you want to cure it, you have to go to the root cause and not cure the what we call the symptom of it . . . . Take for example side pain, or *afo ichibɨ* as they call it. At one point *afo ichibɨ* manifests itself as paining you on the side. At another point you have fever. At another point you have fever and headache. Then at another point you feel body pains all over. Now if the person treating you feels that what is really giving you trouble is side pain. And what you have as other illnesses, general body pain, fever, chest pain or something, he will consider those as sort of symptoms or side effects of the side pain. In that case, to cure you of all those manifestations, he will be treating side pains, *afo ichibɨ*. He will be treating *afo ichibɨ*, knowing that when he treats afo ichibɨ then all the rest will go with it.

In Kom, people also have what they refer to as their "normal sick" in Pidgin (*iko'i iyemi* in Kom). Such an illnesses can be either chronic such as backache or knee pain, or the illness may occur intermittently and in different forms. Such sicknesses often develop in childhood.

What illnesses are people likely to know and recall?

Wombong people as a group know a lot of illness terms. Table 5–2 shows the 77 illness terms that 22 informants mentioned when asked to list as many illnesses as they could. Nearly all of these terms had their own Kom name. Informants mentioned as many as 26 terms and as few as four. On average they mentioned 10.3 terms.

Over half of the 77 unique terms were mentioned by only one or two people. The 30 most common illnesses were mentioned by 3 or more people. The five most common illness mentioned were *atu* (headache), *agvɨl abola* (fever), *asɨ a yafɨna* (eye pain), *ɨlva*

yafɨnɨ (stomach ache), *angvɨ* (epilepsy). Illness that were mentioned most were salient because they occurred frequently in the community [e.g. *atu*, *agvɨl*], were perceived as serious [e.g. *angvɨ*, *ansasi* (leprosy), or *ngoysɨ* (cancer)] , or were very visible [e.g. *ija'* (madness), or *ise'* (goiter)].

In addition to asking each informant to list all the illnesses they knew, we asked them to describe each illness. We also asked Kom medical experts to translate all the Kom terms into English. These experts included registered nurses and long-time vendors of pharmaceuticals. Table 5–3 shows the range of translations for two of these experts.

Medical experts disagree with laypeople regarding some of the illness terms. In the lay population, the terms *ngoysɨ* and *ngwosɨ* refer to serious illnesses associated with cancer. Most laypeople consider the terms as synonyms, but some draw distinctions between the terms. Medical experts translate both terms into either *otietis media* or *osteomyelitis,* an infection of the ear. A similar phenomenon occurs with the terms *afo a woynda* and *afo ichibɨ* . For laypeople these terms refer to the "child's illness" (or "side pain" in Pidgin). Again, some laypeople distinguish between the terms while others do not. For most of the medical experts, however, the illness is associated with either an inflammation of the spleen (the consequence of malaria) or pneumonia. Both laypeople and experts recognize these illnesses as life threatening.

How similar and different are illnesses to laypeople?

To further explore the relationships among illnesses, we selected 36 illnesses from the original 77 for additional study. We wrote the Kom names of the illnesses on index cards and asked 11 literate informants to perform successive pile sorts on the 36

illnesses. I measured the association between all pairs of illness by counting the number of times that informants placed any two illnesses in the same pile. Since each informant performed the exact same task, I could also compare informants. While sorting the cards, some of the informants talked to themselves or explained to onlookers why they were putting some illnesses together and separating others. We taped these ethnographically rich conversations whenever possible. The data from the pile sorts and the unprompted ethnographic descriptions helped me to identify some of the principle criteria by which Wombong people organize the domain of illnesses.

Figure 5–1 shows the pile sort data plotted in a 2-dimensional, nonmetric multidimensional scale. The multidimensional scale has a stress of 0.18. Figure 5–2 shows the same data analyzed with an average link hierarchical cluster analysis (Johnson 1967; Borgatti 1990). Both figures suggest that people separate illnesses into five general groups associated with head, chest/side, stomach, skin, and chronic pains (see Figure 5–3). In the MDS plot, these illnesses in each of the groups lie near each other. In the cluster analysis, group members are joined at higher levels.

Two informants who were conducting the pile sorting task together, add further support for this grouping criterion:

CH: They are all illnesses of the head.

GR: If you put it that way, then toothache and blindness should join them.

CH: Yes. . . . .

GR: Did you say "*angv-i*" (epilepsy) has no link with headache?

CH: It attacks the brain and the brain is in the head.

GR: That is why I grouped it with madness. . . . .

GR: These ones are specific parts of the body.

CH: *Ɨyuŋ* (joint) *ɨlva* (stomach), *ɨjem* (back), *atu* (head), *ise'* (goiter).

Some illnesses, however, do not belong to any one group [e.g. *ise'* (goiter), *angvɨ* (epilepsy), *antaŋ* (small pox), and *shiŋsho* (yaws)]. These illnesses tend to lie in the center of the MDS plot or are linked to other groups at lower levels in the cluster analysis.

The low stress (0.19) for 36 items suggests that informants are also distinguishing illnesses along two major dimensions. I have tentatively interpreted the dimensions as serious/nonserious and young/old. On the horizontal dimension, nonserious skin illnesses are found on the extreme left while the more serious head illnesses are found on the right. On the vertical dimension, illnesses associated with the elderly cluster at the top while those associated with children cluster near the bottom.

In addition to sorting illness by body parts, seriousness, and duration of illness, informants distinguished among illness by symptoms, causality, associated treatments, and internal/external distinctions. For example, one informant made three comments about causality while sorting the illnesses:

M: Some madness starts by epilepsy. . . . .

M: Sometimes we hear that high fever causes mild madness. . . . .

M: *Agvɨl* leads to *agvɨl ato* (high fever), joint pains, knee pains, and sometimes malaria. . . . .

Another informant grouped illnesses according to their symptoms, "Watch. *Nka'*, *ighasaghasa*, *alɨ*, *ngoysɨ* and all illnesses in this group discharge pus." Two informants who sorted the illnesses together distinguished between internal and external types of illness. For example:

GR: We can join all these sicknesses of the stomach (*tiko 'ɨ tɨ ɨlva*) here because they all come from within; from inside. They now form a group of illness now that come from within. . . . .

CH: Joints and swollen feet?

GR: Yes.

CH: Are you saying that goiter and swollen feet should go together?

GR: The thing is that swollen feet, joints- they are external.

CH: Yes, external.

Sometimes informants considered whether illnesses were contagious. In creating a pile, one informant said, "In doing this one, you will consider the illnesses that are contagious. Those that cross easily." At other times, informants distinguished illnesses by how easily the illness could be cured. For example, consider the exchange between the informant CH and myself:

CH: Then pick out those that are easy to cure, then those that are difficult to cure, then you'll take them out from this group.

Gery: So how do you break that?

CH: First of all, in this group, we have cancer (*ngwosɨ*) which is difficult to cure. Even this one is still cancer. So you'll pick *alɨ* (abscess), *mɨmɨ*

(boils), scabies (*boynisi chus*) and all those things that are easy to cure put on one side.

In general, the 11 informants agreed with each other as to how the illnesses should be grouped together. When I submitted the pile sort data to a consensus analysis, the ratio between the first and second eigen values was 12.8 and all informants' competency scores were positive ranging between 0.29 to 0.82 with a mean of 0.64. Despite the large number of criteria that people expressed while sorting the illnesses, people agree as to how illnesses are associated with one another.

How do laypeople perceive illness severity?

Wombong people also agree among themselves about the strength (or seriousness) of different illnesses. We asked 57 people to rate 32 illnesses on a scale of weak (*bol*), neutral (*to wi , bol wi*), or strong (*to*). If they indicated that the illnesses was either strong or weak, we asked them if it was very strong, or very weak. This task produced a five-point seriousness scale. I conducted a consensus analysis on the data. As in the pile sort data, there were strong indications of agreement. The ratio of the first and second eigen values was 11.24 and all but one informant had positive competency scores. I dropped this informant in subsequent analysis. The average competency rating of the remaining 56 individuals was 0.68 (std 0.10).

Table 5–4 shows the Kom severity ratings for the 32 illnesses. The five most serious illnesses are *angvi*, AIDS (*CIDA*), *ija'*, *ansasi* (leprosy), and *atu a chwotina*. The five least serious were *ighasaghasa* (ringworm), *agvil*, *akesi*, *nkaysi* (scabies), *mimi* (boils), and *atu*.

To assure that the agreement about illness severity did not arise out of our simplistic means of rating illness strength, we also asked 50 informants (25 who had already performed the rating task) to indicate on a magnitude scale how serious they thought the same 32 illnesses were. We asked informants to examine a line that represented the strength of *akesi*, then to draw lines indicating the strength for each of the other illnesses. Table 5–5 shows the magnitude scale for severity. The means obtained from both the rating and magnitude techniques were correlated at 0.90 ($p<.001$).

When the means produced from both techniques were converted to rank orders and then compared, the Spearman's rank order coefficient is 0.89. Both techniques identified the same five most serious and least serious illnesses. What difference there is between the two techniques is seen in the amount of variation around each mean. In the rating task, the standard deviation is highest around illnesses with middle mean scores and lowest at the most serious. In the magnitude task, the mean and standard deviations are directly correlated. More serious illnesses have higher standard deviations.

As in the rating task, informants agreed among themselves about the strength of each illness. A consensus analysis of the interval data found that the ratio of the first and second factors was 5.54, indicating a consensus. Again, only one informant had a negative competency rating and the average competency for the remaining 49 individuals was 0.62 (std 0.17).

In general, people from Wombong share similar knowledge about illnesses. They all hold that illnesses are animated entities, and most agree that illnesses come from natural causes, from personal transgressions, and can be sent by evil people. Despite a

multitude of potential sorting criteria, people tend to agree about what illnesses go together. They also agree among themselves about both the rating and magnitude of illness strengths.

What Do People Think About Treatments

To examine people's perceptions of treatments, we asked 23 informants to perform triad tests of six treatment modalities (hospital, health center, nurse, traditional healer, pills, and home remedies). We measured the degree of association between modalities by counting the number of times that people place treatment together. Figure 5–4 shows the average hierarchical clustering of the six modalities based on the triad data. There is a clear distinction between the health center, hospital, and nurse group, and the pills, home remedies, and traditional healer group. The same data form a unidimensional scale (stress 0.157) shown in Figure 5–5. On this scale, the health center lies at one end, followed by the hospital and nurse. At the other end of the scale are traditional healers, pills, home remedies. On the unidimensional scale, pills and home remedies are almost identical. I speculate that the scale represents a dimension associated with care that takes place inside the compound versus care that takes place outside the compound.

Unlike the association among illnesses, informants were not in agreement over which modalities went together. A consensus analysis revealed that the data were not well explained by a single factor (first to second eigen value ration = 1.5 with negative competency scores for informants). This indicates that there is no cultural consensus about which modalities go together. Given the small number of treatments used in the

task, as well as the large number of ways of sorting the items (by cost, efficacy, location where treatments were administered, control over process, etc.), we would need a larger sample size to determine if different groups of people organized the modalities in different ways. In hindsight, we probably should have used pile sorts or paired comparisons.

What do people know about how to administer home remedies?

We asked 200 informants whether they knew how to cure any of the 31 illnesses listed in Table 5–6. On average, people reported knowing how to cure 6.0 illnesses (19%) of the 31 illnesses asked. Informants claimed to cure anywhere from 0 to 25 illnesses (0% to 81%), with a median of five and a standard deviation of 4.7. Figure 5–6 shows the histogram of informant's knowledge of home remedies. The scree plot in Figure 5–7 shows that over 80% of the informants knew how to cure at least one illness. Less than 20% knew how to cure more than nine illnesses.

Table 5–6 shows the percentage of men and women who claimed to know how to cure each of the31 illnesses. Over a third of the informants claimed to know cures for common and less severe illnesses such as *ɨlva ko 'nɨ*, *ighasaghasa*, *atu*, *akes*i, *mbvɨtɨ* and *alvɨ a yafɨna*. Less than 5% of our informants claimed to know remedies for *ansasi*, *ise'*, *angvɨ*, *ija'*, *ɨvɨmuytɨnɨ*, *ise*, *ngwosɨ*.

On average, men claimed to cure significantly more ($p < 0.01$) illnesses (7.1) than women claimed to cure (5.3). Figure 5–8 shows that for the most part, men know more remedies for most illnesses except for *mbvɨtɨ*, and *ighasaghasa*. Over 15% more men than women claim to know remedies for *atu*, *alvɨ a yafɨna*, *mɨnji*, and *atu a chwotɨna*.

Older people also claimed to cure more illnesses. Informants under the age of 30 knew how to cure 4.7 illnesses (std 3.5); informants between 30 and 50 years old knew how to cure 6.0 illnesses (std 5.0); and informants over 50 knew how to cure 7.8 illnesses (std 5.2).

Although illiterate informants knew how to cure more illnesses (6.7 on average) than literate people knew how to cure (5.4 on average), the difference was not statistically significant ($p>0.1$). I used a multiple regression model to examine the effects of age, education, and number of children on the number of illnesses people claimed to cure. Only age accounted for a significant amount of the variation (roughly 10%) in the dependent variable.

What do people know of healers?

We also asked the same 200 informants if they knew a healer who could cure any of the 31 illnesses. On average, informants reported knowing someone for 9.6 (31%) of the 31 illnesses. Informants reported knowing someone for 0 to 27 illnesses (0% to 87%), with a median of nine and a standard deviation of 6.1 illnesses. Figure 5–9 shows the distribution of total illnesses for which informants knew someone who could help them. The scree plot in Figure 5–10 compares people's knowledge of home remedies to their knowledge of others who know how to cure illness. Over 95% of the informants knew of someone that cured one of the 31 illnesses. Less than 20% knew someone for more than 14 illnesses.

Table 5–7 shows the percentage of informants who knew of someone who cured for each of the 31 illnesses. Over half of the informants claimed to know of someone who

cured severe illnesses such as *afo a woynda*, *aksesi azwena*, *ise*, *ngwosi*, and *atuŋli a yafina*. Less than 10% of the informants knew someone who could cure *ivimuytini*, *ise'*, *ansasi*, and *tighongwoŋ*. *Ivimuytini* refers to the swelling of the legs and can be associated with diabetes or elephantitis. Although there is a leprosy (*ansasi*) clinic in Mbingo, the illness has never been cured by traditional Kom medicine. *Ise'*, or goiter, is curable with the administration of iodized salt.

On average, men claimed to know of someone to cure 10.1 illnesses, while women know someone to cure 9.2 illnesses ($p > 0.05$). Table 5–7 shows that men are apt to know someone who cures *asi a yafina*, *ilva yafini*, *atu a chwotina*, *ngwosi*, or *iyuŋ* while women are apt to know someone who cures *akesi azwena* or *ise*.

Unlike people's personal knowledge of home remedies, age does not play a significant role in determining the number of illnesses that an informant knows of someone who cures it. Literacy, however, does play a role. Literate informants know of people who can cure more illnesses than illiterate informants know. On average, literate people know 10.5 illnesses that can be cured by someone they know, while illiterate people know 8.5 illnesses that can be cured by someone they know. Table 5–8 shows that at least 15% more literate informants than illiterate informants knew of people who cured *ilva cho'ni*, *ilva yafini*, *akesi*, and *ighasaghasa*. This is the opposite of what I found for informants' personal knowledge of home remedies (where illiterate people knew how to cure more illnesses than literate people knew).

I used a multiple regression model to examine the affects of age, sex, education, and number of children on the number of illnesses where people knew someone who

cured them. When I measured education as a continuous variable, there was no effect on the dependent variable. Only age accounted for a significant amount of the variation (roughly 2%) in the dependent variable.

There is a direct, although weak, relationship between the number of illnesses one knows how to cure and the number of illnesses that one knows of someone else who cures them ($r = 0.34$, $p>0.01$). Table 5–9 shows that the relationship between knowing-how and knowing of someone who cures is not uniform across all groups of informants. The relationship is strongest for younger and literate informants than for older and nonliterate informants.

Figure 5–11 shows the relationship between the number of knowing-how and knowing-of remedies for all 31 illnesses. Those illnesses located in the lower left corner of the plot are the illnesses that Kom medical tradition has the most difficulty curing. Those illnesses (e.g. *ighasaghasa*, *mbvɨtɨ*, and *nkaysɨ*) that lie to the upper left of the center line are known by informants. Those illnesses in the bottom right corner of the plot are those that professional Kom healers tend to know how to cure and laypeople do not. These include *ija'*, *ngwosɨ*, *ise*, *atuŋlɨ*, *akesi azwena*, and *afo a woynda*.

Which treatments do people prefer?

We asked 229 informants to tell us which of five treatment modalities (pills, traditional healers, clinic, hospital, nurse) they would try first, second, third, fourth, and fifth when confronted with 21 different illnesses. In the analysis of these data, I excluded two of original 21 illnesses (*ɨlva ko'nɨ*, and *tumbuyn*). Over 10% of the informants

refused to talk about both of these illnesses because they associated the illnesses with poisoning and witchcraft. I analyzed the data from the remaining 19 illnesses.

On average, informants chose pills first for 8.6 illness (46.2%), traditional medicine first for 5.6 illnesses (30.2%), hospital first for 2.2 illnesses (11.8%), clinic for 1.6 illnesses (8.8%), and nurse first for only 0.6 illnesses (3.0%). Figure 5–12 shows the distribution of preferences for each treatment modality over all 19 illnesses. Although informants often selected pills as their first choice, they rarely selected pills as a second, third and fourth choice. In contrast, people consider the hospital and clinic as good second and third choices rather than good first choices. People selected traditional healers as their first choice for approximately 30% of all the hypothetical illnesses. This rate gradually slopes off for second, third, and fourth choices.

There is a cultural consensus regarding which treatment modalities should be used first for each of the 19 illnesses. A consensus analysis on these data found that only 3 of the 229 informants had negative competencies. When these three individuals were dropped, the ratio of the first factor to the second factor was 5.1 and the competencies all informants were positive, with an average of 0.55 (std 0.17). The cultural model suggests that for all 19 illnesses, the preferred first choice of treatment is either pills or traditional healers. Table 5–10 shows the frequencies of treatment modalities chosen first for each illnesses. An * beside the treatment modality indicates that the modality was selected as first choice by the consensus model. The model suggests that *afo ichibɨ*, *abvi a kejem*, *afo a woynda*, *akesi azwena*, *ichfi ɨ fidwo'*, *minji*, *iyuŋ*, and *ɨvimuytinɨ* are all associated with traditional healers rather than with pharmaceuticals.

Figure 5–13 displays the relationships between illnesses and treatment modalities in two-dimensional space. The figure is the results of a correspondence analysis of the average preferences for all 5 treatment modalities by all 19 illnesses. Correspondence analysis performs a singular value decomposition of an adjusted data matrix in which rows and columns have been separately normalized to yield more equal marginals. The rows and columns are then displayed in a common multidimensional space (Borgatti 1992) (see Moore and Romney (1994) for examples).

Traditional healers and pills define the endpoints of the first dimension. Illnesses strongly associated with traditional medicine cluster to the left of the scale. Illnesses best cured by pills lie to the right. The treatment modalities hospital, nurse, and clinic are in the middle of the scale because they tend to be second, third, and fourth choices for many illnesses. Illnesses that lie in the middle also indicate some ambivalence on the part of informants to strongly associate an illnesses with one particular treatment.

Overall, Wombong residents agree with each other in how they think about illnesses and treatments. People agreed about which illnesses went together, and they agreed in their ratings of illness severity. There was also a general consensus about which treatments should be used first for 19 of the most common illnesses. Laypeople, however, did not in agreement over which treatments went together. This could be due to the small number of treatment items used in the survey as well as the technique for measuring the relationships between treatments.

We did find significant differences in peoples' knowledge of how to cure various illnesses. Men claimed to know how to cure more illnesses than did women. Men also

claimed to know of more healers than did women. This could be related to the fact that the 75% of all the healers identified from Wombong were men, and 89% of all the healers outside the village were men. These facts arise despite the fact that our sample included more women than it did men. We also found that literate people know more healers than did illiterate people. Given these findings about what people know, we expect that male caretakers use more home remedies than do women and are more likely to take patients to the doctor than are women. We might also think that literate people are more likely to use traditional healers than are men. These hypotheses will be tested in Chapter 7.

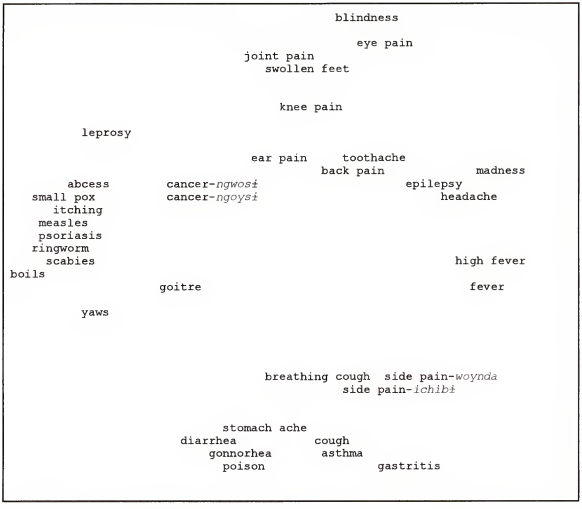


Figure 5–1 Multidimensonsal scaling of successive piles sorts of 36 kom illnesses (N=11).

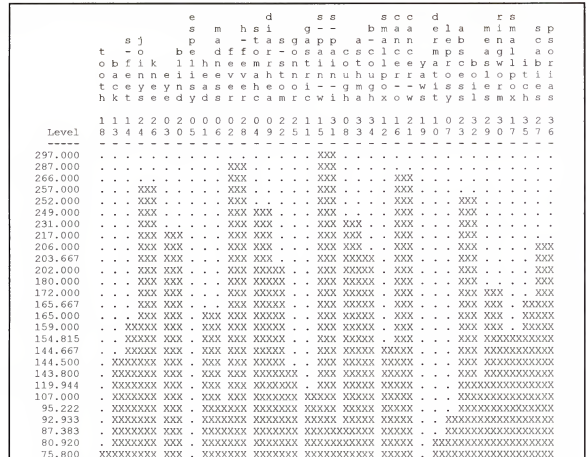


Figure 5–2 Cluster analysis of pile sort data (average link method).

Head
atu (headache)
atu a chwot+na (high headache)
agv+l (fever)
agv+l ato (high fever)
angv+ (epilepsy)
ija' (madness)

Chest/Side
akesi (cough)
+chf+ + f+dwo' (gastric)
afo a woynda (side pain)
afo ichib+ (side pain)
anfem+ (cold)
abvi a kejem (breathing cough)
akesi azwena (asthma)

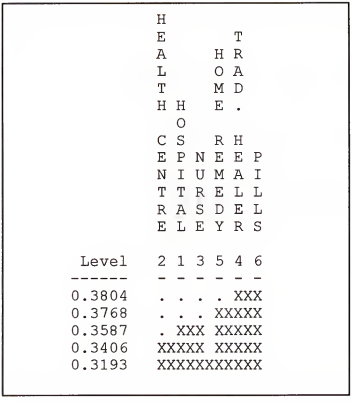
Skin
al+ (abscess)
ighasaghasa (ringworm)
mbv+itu (measles)
nkays+ (scabies)
m+m+ (boils)
ayus (itching)
nka' (psoriasis)
ise (dermatitis)

Stomach/Digestive
+lva yafina (stomach ache)
+lva cho'n+ (diarrhea)
tumbuyn (swollen stomach)
m+nj+ (gonorrhea)
+lva ko'n+ (poison)

Chronic
asi a yaf+na (eye pain)
+jem i yaf+na (back ache)
anfef (blindness)
+v+muyt+n+ (swollen feet)
+yuŋ (joint ache)
alv+ a yaf+na (knee pain)

Others
ise' (goiter)
atuŋl+ a yaf+na (ear pain)
antaŋ (small pox)
shinsho (yaws)
ngwos+ (cancer)
ngoys+ (cancer)
isoŋ i yaf+na (toothache)
ansasi (leprosy)

Figure 5–3 Kom illness terms grouped by general categories.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0.3768 . . . XXXXX
0.3587 . XXX XXXXX
0.3406 XXXXX XXXXX
0.3193 XXXXXXXXXXX

Figure 5–4 Hierarchical cluster analysis (average method) of data from triads of treatment modalities (N=23).

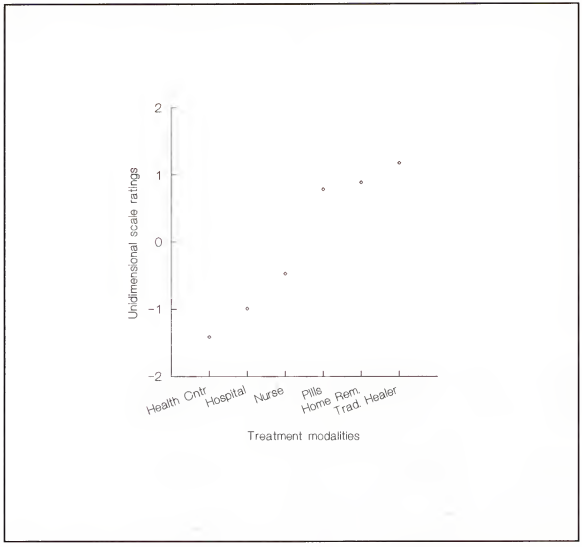

Figure 5–5 Unidimensional scale among six treatment modalities from triad data (N=23).

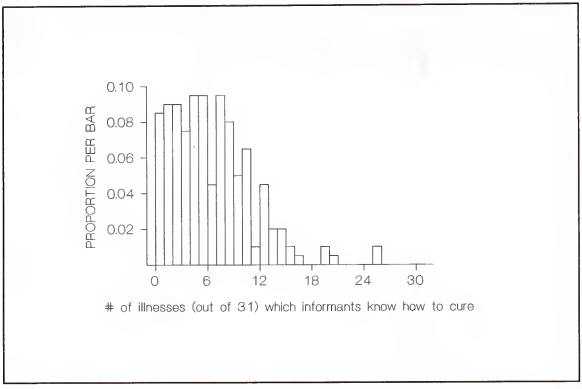

Figure 5–6 Histogram of informant knowledge of home remedies (N=200).

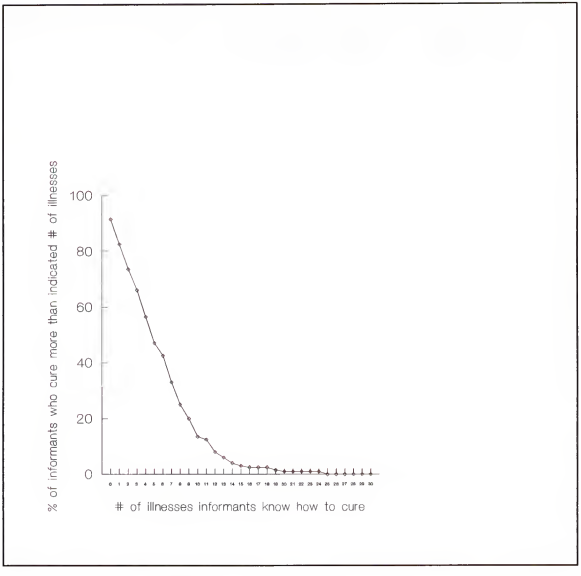

Figure 5–7 Scree plot of knowledge of home remedies based on data from 200 informants.

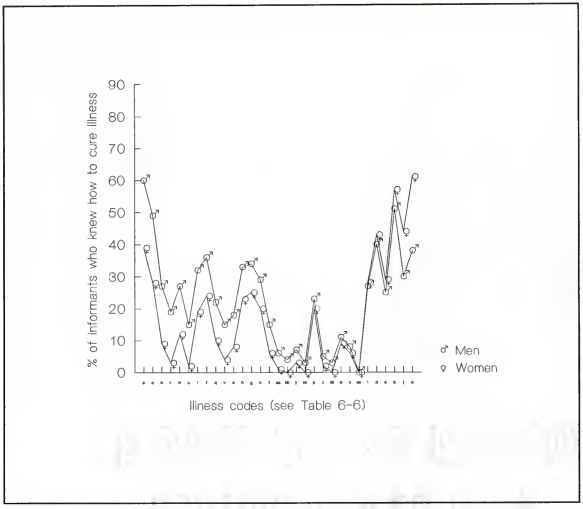

Figure 5–8 Informant knowledge of home remedies for 31 illnesss by gender (N=200).

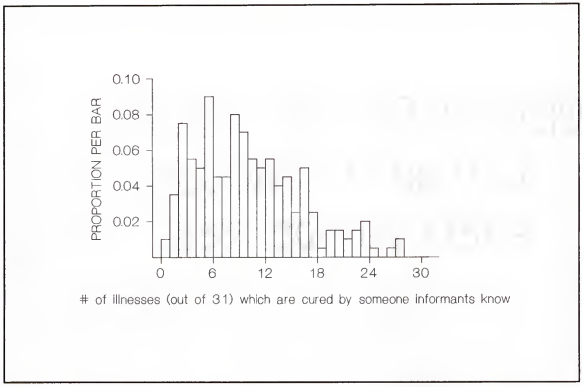

Figure 5–9 Histogram of informants' knowledge of people who cure illnesses (N=200).

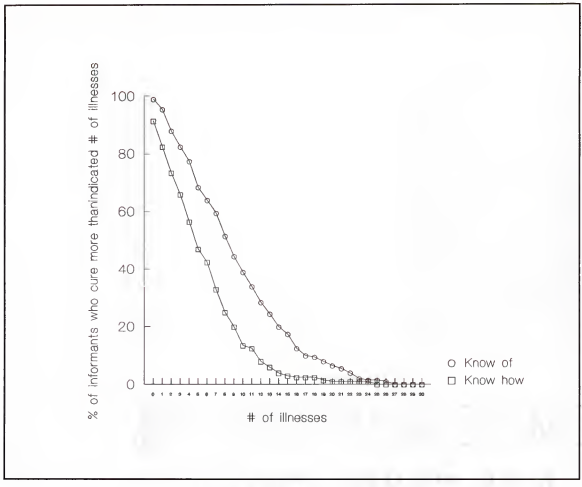

Figure 5–10 Scree plot of local medical knowledge (knowing how and knowing of) based on data from 200 informants.

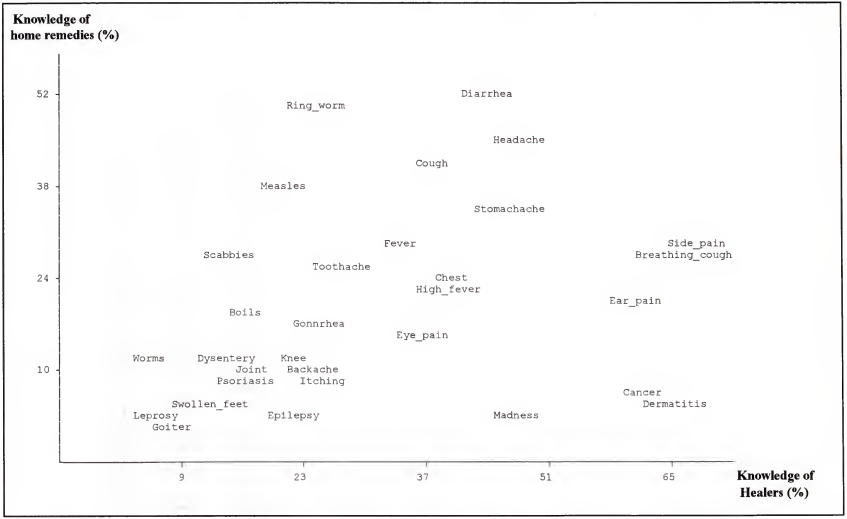

Figure 5–11 Percentage of respondents who reported knowing home remedies by percentage of respondents who reported to know a healer for 31 illnesses (N=200).

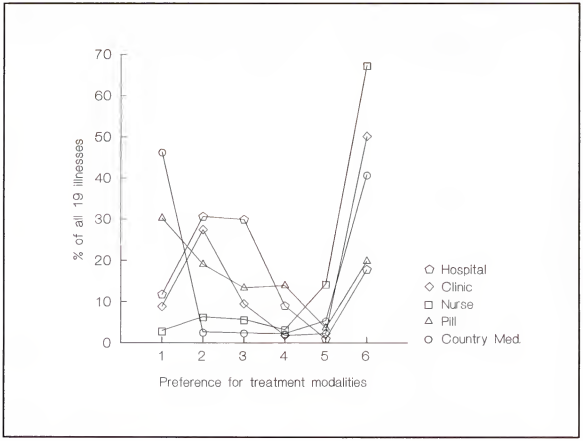

Figure 5–12 Respondents' preferences for 5 treatment modalities as reported for 19 hypothetical illness scenarios (N=229).

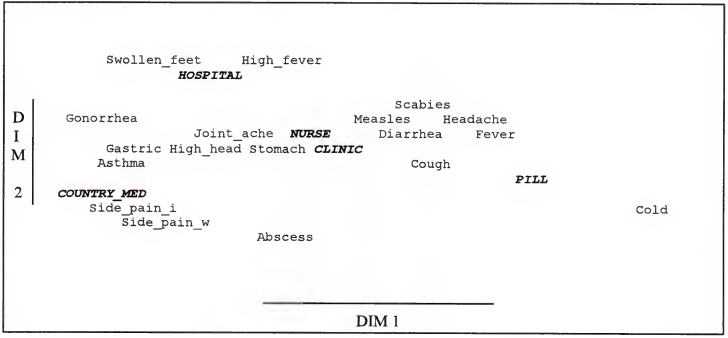

Figure 5–13 Correpsondence analysis of preference data (N=229).

Table 5–1 Kinds of knowledge.

Knowledge	Type of Knowledge	Examples	Factors Affecting Transmittion
Know-of	Propositional	A) Know of a good cookbook. B) Know of a person to cure illness X.	Access to Information.
Know-that	Propositional	A) Know that plant X is called Y. B) Know that illnes X has characteristic Y.	Access to Information, Learning & Peer Pressure.
Know-which	Evaluative	A) Know that X is a *prettier* than Y. B) Know that treatment X is *better* than treatment Y for a particular illness.	Peer Pressure.
Know-how	Practical	A) Know how to ride bicycle. B) Know how to cure an illness.	Learning & Experience

Table 5– 2 Results of free list task (N=22).

	Item	Frequency	Percent
*1	*atu* (headache)	14	64
*2	*agvɨl abola* (fever)	13	59
*3	*asɨ a yafɨna* (eye pain)	10	45
*4	*ɨlva yafɨnɨ* (stomache ache)	10	45
*5	*angvɨ* (epilepsy)	9	41
*6	*ija'* (madness)	8	36
*7	*ansasi* (leprosy)	7	32
*8	*akesi* (cough)	7	32
*9	*ɨlva cho'nɨ* (diarrhea)	6	27
*10	*ise'* (goitre)	6	27
*11	*ɨchfɨ ɨ fidwo'* (chest pain)	6	27
*12	*atuŋlɨ a yafɨna* (ear pain)	6	27
*13	*ɨjem i yafɨnɨ* (back pain)	5	23
*14	*ɨvɨmuytɨnɨ* (swollen feet)	5	23
*15	*afo a woynda* (side pain)	5	23
*16	*ngoysɨ* (cancer)	4	18
*17	*antaŋ* (small pox)	4	18
*18	*isoŋ i yafɨnɨ* (tooth pain)	4	18
*19	*shiŋsho* (yaws)	4	18
*20	*anfef* (blindness)	4	18
*21	*ngwosɨ* (cancer)	4	18
*22	*tumbuyn* (dysentary)	4	18
*23	*alɨ* (absess)	4	18
*24	*ɨyuŋ* (joint pain)	3	14
*25	*mɨnji*(gonnorhea)	3	14
*26	*alvɨ a yafɨna* (knee pain)	3	14
*27	*nkaysɨ* (scabies)	3	14
*28	*agvɨl ato* (high fever)	3	14
*29	*mbvɨtɨ* (measles)	3	14
*30	*ighasaghasa* (ring worm)	3	14
*31	*afo ichibɨ* (side pain)	2	9
32	*aji* (wound)	2	9
33	*ɨfuo nyiŋmɨ* (boils)	2	9
34	*atu a chwotɨna* (high headache)	2	9
*35	*mɨmɨ* (boils)	2	9

Table 5–2 -- Continued

	Item	Frequency	Percent
36	*ɨshue* (lower abdominal)	2	9
37	*ifyen imuytini* (elephantitis)	2	9
38	*anoŋ* (?)	2	9
39	*anfemtɨ* (cold)	2	9
40	*avɨ a kolna* (broken foot)	1	5
41	*atu a tsɨlina* (hearing impairment)	1	5
42	*nime'* (mumps)	1	5
43	*anku'* (dumbness)	1	5
44	*ankeblɨ* (?)	1	5
45	*ikeblɨ* (?)	1	5
46	*ɨlva luynsɨnɨ* (constipation)	1	5
47	sore throat	1	5
48	typhoid	1	5
49	syphillis	1	5
50	gonnorea	1	5
51	*abas atu a yafɨna* (side headache)	1	5
52	*abi a ko'na* (swollen lap)	1	5
53	*ɨvɨs ɨ fɨyini* (exema)	1	5
54	*abvi a kejem* (breathing cough)	1	5
55	*ɨkoe yafɨnɨ* (arm pain)	1	5
56	*gum* (shoulder ?)	1	5
57	*ɨsuyn* (pimples)	1	5
58	*abi a yafɨna* (lap pain)	1	5
59	*tɨghoŋxwoŋ* (worms)	1	5
60	*fimba'* (fast heart beat)	1	5
*61	*akesi azwena* (breathing cough)	1	5
62	*ayum* (drying up)	1	5
63	convulsion	1	5
64	*iko'ifeni* (fainting sickness)	1	5
65	*ɨwuyn yafnɨ* (body pains)	1	5
66	*iko'ɨ mbingo* (leprosy)	1	5
67	*mɨli* (bile)	1	5
68	*ɨtoŋ* (neck pain)	1	5
69	*asɨ a laŋlina* (sight impairment)	1	5
70	*iyuŋsɨ* (mild madness)	1	5

Table 5–2 -- Continued

	Item	Frequency	Percent
71	*insue* (?)	1	5
*72	*ayus* (itching)	1	5
73	*mbu'sɨ* (chiggers)	1	5
74	*ɨlva ko'nɨ* (swollen stomach)	1	5
*75	*nka'* (scabies)	1	5
76	*atem* (from chusü)	1	5
77	*ɨtuŋlɨ* (ear pain)	1	5

Total mentions: 226
Mentions per respondent: 10.3

* Term selected for pile sort analysis.

Table 5–3 English Translations of Kom illness terms ranked by fequency of occurrence in free list task.

			Translator	
Rank	Kom	English	George	Pa
1	*atu*	headache	Y	Y
2	*agvɨl abola*	fever (mild or light)	Y	Y
3	*asɨ a yafɨna*	eye pain conjunctivitis	Y	 Y
4	*ɨlva yafɨnɨ*	stomache ache	Y	Y
5	*angvɨ*	epilepsy	Y	Y
6	*ija'*	madness	Y	Y
7	*ansasi*	leprosy	Y	Y
8	*akesi*	cough	Y	Y
9	*ɨlva cho'nɨ*	diarrhea dysentery	Y	Y Y
10	*ise'*	goitre	Y	Y
11	*ɨchfɨ ɨ fɨdwo'*	chest pain gastritis	Y	 Y
12	*atuŋlɨ a yafɨna*	ear pain otietis media	Y	 Y
13	*ɨjem i yafɨnɨ*	back ache	Y	Y
14	*ɨvɨmuytɨnɨ*	swollen feet oedema of the feet	Y	 Y
15	*afo a woynda*	side pain spleen inflamation	Y	 Y
16	*ngoysɨ*	cancer otietis media, osteomyelitis	Y	 Y
17	*antaŋ*	small pox	Y	Y
18	*isoŋ i yafɨnɨ*	tooth ache	Y	Y
19	*shiŋsho*	yaws	Y	Y
20	*anfef*	blindness	Y	Y
21	*ngwosɨ*	cancer oteitis media, osteomyelitis	Y	 Y
22	*tumbuyn*	dysentary	Y	Y
23	*alɨ*	abscess	Y	Y

Table 5–3 -- Continued

Rank	Kom	English	Translator	
			George	Pa
24	*ɨyuŋ*	joint pain	Y	
		arthritis		Y
25	*mɨnjɨ*	gonnorhea	Y	Y
26	*alvɨ a yafɨna*	knee pain	Y	
		arthritis		Y
27	*nkaysɨ*	scabies	Y	Y
28	*agvɨl ato*	high fever	Y	
		cerebral malaria		Y
29	*mbvɨtɨ*	measles	Y	
		chicken pox		Y
30	*ighasaghasa*	ring worm	Y	Y
31	*afo ichibɨ*	side pain	Y	
		pneumonia		Y
32	*aji*	wound	Y	Y
33	*ɨfuo nyiŋŋɨ*	boils	Y	
		multiple abscesses		Y
34	*atu a*	high headache	Y	
	chwotɨna	cerebral malaria		Y
35	*mɨmɨ*	boils	Y	Y
36	*ɨshue*	lower abdominal	Y	
		hernia (♂), supenjiitis (♀)		Y
37	*ifyen imuytini*	elephantitis	Y	
		swollen feet		Y
38	*anoŋ*	?	Y	
		yaws		Y
39	*anfemtɨ*	cold	Y	Y
40	*avɨ a kolna*	broken foot	Y	
		sprain		Y
41	*atu a tsɨlina*	hearing impairment, deafness	Y	Y
42	*nime'*	mumps	Y	Y
43	*anku'*	dumbness	Y	Y

Table 5–3 -- Continued

Rank	Kom	English	Translator George	Translator Pa
44	*ankebl-i*	? encephalitis ?	Y	Y
45	*ikebl-i*	? encephalitis ?	Y	Y
46	*-ilva luyns-in-i*	constipation	Y	Y
47	sore throat	tonsillitis	Y	Y
48	typhoid		Y	Y
49	syphillis		Y	Y
50	gonnorea		Y	Y
51	*abas atu a yaf-ina*	side headache headache	Y	Y
52	*abi a ko 'na*	swollen lap abscess	Y	Y
53	*-iv-is -i fiyini*	eczema	Y	Y
54	*abvi a kejem*	breathing cough asthma	Y	Y
55	*-ikoe yaf-in-i*	arm pain rheumatic pains	Y	Y
56	*gum*	? gingivitis	Y	Y
57	*-isuyn*	pimples	Y	Y
58	*abi a yaf-ina*	lap pain	Y	na
59	*t-ighoŋawoŋ*	worms	Y	
60	*fimba'*	fast heart beat palpitation	Y	Y
61	*akesi azwena*	breathing cough asthma	Y	Y
62	*ayum*	drying up anemia	Y	Y
63	convulsion		Y	Y
64	*iko 'ifeni*	fainting sickness epilepsy	Y	Y
65	*-iwuyn yafn-i*	aches and pains	Y	Y

Table 5–3 -- Continued

	Kom	English	Translator	
			George	Pa
66	*iko 'i mbingo*	leprosy	Y	Y
67	*mɨli*	bile	Y	
		bipigments?		Y
68	*ɨtoŋ*	neck pain	Y	
		?		Y
69	*asɨ a laŋlɨna*	sight impairment, blindness	Y	Y
70	*iyuŋsɨ*	mild madness	Y	
		delirium		Y
71	*insue*	?	Y	
		supenjiitis (♀ only)		Y
72	*ayus*	itching	Y	
		pleuritis		Y
73	*mbu 's ɨ*	jiggers	Y	Y
74	*ɨlva ko 'nɨ*	swollen stomach	Y	
		oedema of abdomen		Y
75	*nka'*	scabies	Y	
		siriasis		Y
76	*atem*	from chusü	Y	na
77	*ɨtuŋlɨ*	ear pain	Y	
		otietis media		Y
**	*ise*	dermatitis	Y	Y

**_ise_ was confused in free list with _ise'_.

Table 5–4 Severity ratings of 32 illnesses.

	Mean	Std. Dev	Min	Max	No. of Observations
Angv+ (epilepsy)	5.00	0.26	3	5	56
CIDA (AIDS)	4.93	0.26	4	5	40
Ija' (madness)	4.89	0.37	3	5	55
Ansasi (leprosy)	4.82	0.54	2	5	55
Atu a chwot+na (high headache)	4.55	0.62	2	5	56
Ngwos+ (cancer)	4.50	0.63	2	5	56
Akesi azwena (asthma)	4.48	0.53	3	5	56
Agv+l ato (high fever)	4.41	0.49	4	5	56
M+nji (gonnorhea)	4.31	0.68	2	5	55
Afo a woynda (side pain)	4.23	0.73	3	5	56
Mbv+t+ (chicken pox / measles)	4.14	0.79	2	5	56
As+ a yaf+na (eye pain)	4.11	0.86	2	5	56
Atuŋl+ a yaf+na (ear pain)	4.05	0.91	1	5	56
Isoŋ i yaf+n+ (tooth ache)	4.00	0.89	1	5	56
~~l~~jem i yaf+n+ (back ache)	3.98	0.90	1	5	56
~~l~~lva cho'n+ (diarrhea)	3.96	0.84	2	5	56
Isc' (goiter)	3.96	0.93	2	5	56
Ivimut (feet)	3.91	1.00	1	5	56
Alv+ a yaf+na (knee pain)	3.82	1.09	1	5	56
~~l~~chf+ + f+dw' (chest)	3.79	0.88	1	5	56
~~l~~lva yaf+n+ (stomach ache)	3.73	0.79	2	5	56
~~l~~yuŋ (joint pain)	3.48	1.00	1	5	56
Nka' (scabies)	3.36	0.89	1	5	56
T+ghoŋawoŋ (worms)	3.34	1.06	1	5	56
Ayus (itch)	3.25	1.06	1	5	56
Isc (rash)	3.20	1.08	1	5	56
Atu (headache)	2.89	0.88	1	5	56
M+m+ (boils)	2.79	1.16	1	5	56
Nkays+ (scabies)	2.68	1.14	1	5	56
Akesi (cough)	2.66	1.06	1	4	56
Agv+l (fever)	2.56	0.93	1	5	55
Ighasaghasa (ringworm)	1.91	1.11	1	4	56

Table 5–5 Magnitude ratings of 32 illnesses.

Illness	Mean	Std. Dev	Min	Max	No. of Observations
CIDA (AIDS)	131.30	53.66	15	216	43
Angv+ (epilepsy)	99.71	39.25	32	210	48
lja' (madness)	98.59	38.59	19	208	49
Ansasi (leprosy)	97.41	35.52	30	206	49
Ngwos+ (cancer)	93.24	32.91	23	205	49
Atu a chwot+na (high headache)	90.73	33.53	27	207	49
Akesi azwena (asthma)	89.20	26.04	35	203	49
Ivimut (swollen feet)	88.50	26.66	36	160	48
Ichf+ + f+dwo'(chest)	88.08	26.11	30	143	49
Ijem i yaf+n+ (back ache)	86.88	31.22	35	158	49
M+njj (gonnorhea)	86.71	32.75	31	206	49
Agv+l ato (high fever)	86.49	30.26	31	167	49
Atuŋl+ a yaf+na (ear pain)	86.18	29.52	26	155	49
Ilva yaf+n+ (stomach ache)	84.98	26.56	21	149	49
Ilva cho'n+ (diarrhea)	84.35	27.47	34	182	49
Isoŋ i yaf+n+ (tooth ache)	83.55	24.14	26	136	49
As+ a yaf+na (eye pain)	83.24	27.33	27	149	49
Mbv+t+ (chicken pox, measles)	82.94	26.27	46	155	49
Afo a woynda (side pain)	79.65	26.13	34	146	49
Iyun (joint)	75.41	27.14	23	135	49
Nka' (scabies)	72.06	26.26	23	155	49
Alv+ a yaf+na (knee pain)	72.04	21.38	25	102	49
Ise (rash)	71.84	25.86	17	154	49
Ise' (goiter)	70.29	28.42	20	138	49
Nkays+ (scabies)	62.38	29.28	18	156	48
Atu (headache)	61.39	25.34	26	131	49
Ayus (itch)	61.39	22.16	22	109	49
T+ghoŋawoŋ (worms)	60.15	25.69	18	127	48
M+m+ (boils)	59.54	27.52	18	152	48
Ighasaghasa (ringworm)	45.51	16.79	17	80	49
Anfemt+ (cold)	40.89	12.84	23	80	46
Agv+l (fever)	38.20	15.50	20	105	49

Table 5–6 Informants' knowledge of home remedies for 31 illnesses (N=200).

		Men		Women		Total	
Code	Illnesses	Freq	%	Freq	%	Freq	%
a	atu (headache)	44	60	49	39	93	46
b	i-lva cho'ni- (diarrhea)	37	51	73	56	110	55
c	i-lva yafi-ni- (stomachache)	35	49	36	28	71	35
d	akesi (cough)	29	40	55	43	84	42
e	ighasaghasa (ring worm)	28	38	78	61	106	53
f	afo a woynda (side pain)	26	36	31	24	57	28
g	agvi-l (fever)	25	34	32	25	57	28
h	isoŋ i yafi-ni- (toothache)	24	33	29	23	53	26
i	i-chfi- i fi-dwo' (gastric)	23	32	24	19	47	23
j	mbvi-ti- (measles)	22	30	56	44	78	39
k	agvi-l ato (high fever)	21	28	25	20	46	23
l	nkaysi- (scabies)	20	27	35	28	55	27
m	mi-mi- (boils)	20	27	15	12	35	17
n	mi-nji (gonnorhea)	19	27	11	9	30	15
o	akesi azwena (asthma)	18	25	37	28	55	27
p	atuŋli- a yafi-na (ear pain)	17	23	25	20	42	21
q	asi- a yafi-na (eye pain)	16	22	13	10	29	14
r	atu a chwoti-na (high head.)	14	19	4	3	18	9
s	alvi- a yafi-na (knee pain)	13	18	10	8	23	11
t	ti-ghoŋawoŋ (worms)	11	15	8	6	19	9
u	ayus (itch)	11	15	2	2	13	6
v	i-yun (joints)	11	15	5	4	16	8
w	i-jem i yafi-ni- (backache)	8	11	11	9	19	9
x	nka' (psoriasis)	6	8	7	6	13	6
y	ngwosi- (cancer)	5	7	4	3	9	4
z	ise (rash)	4	5	3	2	7	3
aa	i-vi-muyti-ni- (swollen feet)	4	6	1	1	5	2
bb	ija' (madness)	3	4	0	0	3	1
cc	angvi- (epilepsy)	2	3	0	0	2	1
dd	ise' (goiter)	2	3	0	0	2	1
ee	ansasi (leprosy)	0	0	0	0	0	0

Table 5–7 Informants' knowledge of people who cure each of 31 illnesses by sex (N=200).

	Men		Women		Total	
Illnesses	Freq	%	Freq	%	Freq	%
afo a woynda (side pain)	50	68	88	69	138	69
akesi azwena (asthma)	42	57	86	68	128	64
ise (rash)	38	52	86	68	124	62
ngwosi- (cancer)	49	67	71	56	120	60
atuŋli- a yafi-na (ear pain)	42	57	74	57	116	58
atu (headache)	30	41	60	47	90	45
ija' (madness)	35	48	55	43	90	45
i-lva yafi-ni- (stomachache)	38	53	48	38	86	43
i-lva cho'ni- (diarrhea)	35	49	49	39	84	42
i-chfi- i fi-dwo' (gastric)	33	45	44	35	77	38
akesi (cough)	27	38	47	37	74	37
agvi-l ato (high fever)	30	42	43	34	73	36
asi- a yafi-na (eye pain)	33	46	34	27	67	33
agvi-l (fever)	26	36	41	32	67	33
isoŋ i yafi-ni- (toothache)	20	27	30	24	50	25
ayus (itch)	17	23	30	24	47	23
atu a chwoti-na (high head.)	22	30	23	18	45	22
mi-nji (gonnorhea)	19	26	26	20	45	22
ighasaghasa (ring worm)	17	23	28	22	45	22
i-jem i yafi-ni- (backache)	16	22	29	23	45	22
alvi- a yafi-na (knee pain)	15	21	28	22	43	21
angvi- (epilepsy)	19	26	21	17	40	20
mbvi-ti- (measles)	12	16	26	20	38	19
mi-mi- (boils)	15	21	18	14	33	16
i-yun (joints)	17	24	16	13	33	16
nka' (psoriasis)	7	10	22	17	29	14
nkaysi- (scabies)	9	12	17	13	26	13
i-vi-muyti-ni- (swollen feet)	8	11	10	8	18	9
ise' (goiter)	5	7	9	7	14	7
ansasi (leprosy)	8	11	1	1	9	4
ti-ghoŋawoŋ (ring worm)	5	7	4	3	9	4

Table 5–8 Informants' knowledge of people who cure each of 31 illnesses by literacy (N=200).

	Literate		Illiterate		Total	
Illnesses	Freq	%	Freq	%	Freq	%
afo a woynda (side pain)	81	74	57	63	138	69
akesi azwena (asthma)	69	63	59	65	128	64
ise (rash)	67	61	57	63	124	62
ngwosi- (cancer)	67	61	53	57	120	60
atuŋli- a yafi-na (ear pain)	69	63	47	52	116	58
atu (headache)	55	50	35	38	90	45
ija' (madness)	49	45	41	45	90	45
i-lva yafi-ni- (stomachache)	59	54	27	30	86	43
i-lva cho'ni- (diarrhea)	54	50	30	33	84	42
i-chfi- i fi-dwo' (gastric)	47	43	30	33	77	38
akesi (cough)	48	44	26	28	74	37
agvi-l ato (high fever)	44	41	29	32	73	36
agvi-l (fever)	39	36	28	31	67	33
asi- a yafi-na (eye pain)	40	37	27	30	67	33
isoŋ i yafi-ni- (toothache)	34	31	16	18	50	25
ayus (itch)	26	24	21	23	47	23
atu a chwoti-na (high head.)	27	25	18	20	45	22
ighasaghasa (ring worm)	32	28	13	14	45	22
mi-nji (gonnorhea)	27	25	18	20	45	22
i-jem i yafi-ni- (backache)	26	24	19	21	45	22
alvi- a yafi-na (knee pain)	25	23	18	20	43	21
angvi- (epilepsy)	20	18	20	22	40	20
mbvi-ti- (measles)	25	23	13	14	38	19
mi-mi- (boils)	25	23	8	9	33	16
i-yun (joints)	20	18	13	15	33	16
nka' (psoriasis)	16	15	13	14	29	14
nkaysi- (scabies)	18	17	8	9	26	13
i-vi-muyti-ni- (swollen feet)	13	12	5	6	18	9
ise' (goiter)	8	7	6	7	14	7
ansasi (leprosy)	7	6	2	2	9	4
ti-ghoŋawoŋ (worms)	5	5	4	4	9	4

Table 5–9 Pearson's correlations between claiming to know home remedies for 31 illnesses and for claiming to know a traditional healer for 31 illnesses by characteristics of informants.

Group Characteristics	Pearson's Correlations Between Knowing Home Remedies and Knowing Healers	Probability	Number of Observations
Sex			
Men	0.31	<0.01	73
Women	0.36	<0.01	127
Education			
Literate	0.46	<0.01	109
Illiterate	0.28	<0.01	91
Age			
<30 years	0.57	<0.01	85
30 - 50 years	0.36	<0.01	57
>50 years	0.23		58
Total	0.34	<0.01	200

Table 5–10 Frequencies of treatment modalities chosen first for 19 illness (N=226).

Illness	Treatment Modalities				
	Pill	Country Medicine	Clinic	Hospital	Nurse
anfemtɨ (cold)	220*	3	2	1	0
agvɨl (fever)	191*	16	11	5	2
atu (headache)	176*	22	15	2	11
akesi (cough)	165*	27	16	9	8
ɨlva cho'na (diarrhea)	154*	37	16	11	6
nkaysɨ (scabies)	139*	18	33	23	10
mbvɨtɨ (measles)	128*	41	20	29	4
alɨ (abscess)	117*	68	15	18	7
ɨlva yafɨnɨ (stomachache)	105*	74	23	20	3
agvɨl ato (high fever)	97*	17	32	65	14
atu a chwotɨna (high head.)	76*	72	17	56	4
afo ichibɨ (side pain)	50	149*	7	12	5
abvi a kejem (breathing cough)	37	138*	11	20	3
afo a woynda (side pain)	61	138*	11	10	3
akesi azwena (asthma)	48	121*	17	31	8
ɨchfɨ ɨ fɨdwo' (gastric)	59	99*	19	39	8
mɨnji (gonnorhea)	28	98*	34	50	2
ɨyuŋ (joint pain)	81	80*	18	33	6
ɨvɨmuytɨnɨ (swollen feet)	37	72*	29	67	7

*First choice according to consensus model.

CHAPTER 6
WHAT DO PEOPLE DO?

In many parts of the world, sick people select among treatments that may span several medical traditions. In Africa, these traditions include: biomedicine, Christian healing, Muslim healing, herbalistic healing, sorcery and divination. There is, in fact, overwhelming evidence that laypeople in Africa move back and forth among professional and folk healers, in a sequence of treatment behaviors (Chavanduka 1978; Janzen 1978b; Good, C. 1987).

In this chapter, I examine 454 treatment sequences collected in the compound survey. I ask two questions: "What do laypeople do when they or their dependents are sick?" and "What does this tell us about how they decide on what to do?" To answer the first question, I examine patterns in treatment sequences, and the transition from one treatment, or "modality," to another. I then use the patterns I discover to intuit how laypeople decide on appropriate care when they are sick. This intuition is developed from and backed up by data from in-depth interviews. I do not "explain" why such treatment patterns occur, but leave that for Chapter 7.

Sequential Treatment Data

Treatment sequences are composed of an ordered series of seven actions.

Treatments	**Code**
waiting 24 hours without doing anything	*waiting*
using home remedies	*home remedies*
taking pills/pharmaceutical	*pharmaceuticals*
going to traditional healers	*traditional healers*
going to the hospital	*hospital*
going to the government health clinic	*clinic*
going to the private nurse	*nurse*

These treatment modalities need not be mutually exclusive (people may use a home remedy and go to the clinic, for example), but they are nearly exhaustive. They represent alternatives along two dimensions: a) self versus professional care, and b) traditional versus biomedical. Although we selected the categories for theoretical purposes, our Kom informants readily recognized the modalities as being distinct.

Three of the treatment modalities are administered by laypeople rather than by medical specialists. These include, waiting, home remedies, and the purchase of pharmaceuticals. Home remedies included all treatments that were administered in the home by nonspecialists and that were not purchased at a local store. Most treatments consisted of herbal remedies that compound members knew, but the treatments could also include special bathing practices, hot compresses, and special foods such as burnt bananas. See Appendix B for a list of all treatments/remedies offered by our informants.

Pharmaceutical treatments included all manufactured products that were purchased by the family without the recommendation of a recognized medical specialist. The most common drugs purchased where: aspirin, paracetamol, penicillin, chloroquine (and related products), and tetracycline) The pharmaceutical category included products that were in the household that a medical specialist had prescribed for a previous illnesses episode. See Appendix B for a list of all pharmaceuticals mentioned by our informants.

After pretesting our interview schedule, we decided to include waiting 24 hours as a separate treatment modality. We found that caretakers would often recognize and diagnose an illness but would not initially react to it for at least a day. Waiting to see if the illness went away by itself was a common tactic.

Four of the treatment modalities were administered by medical professionals, and included traditional healers, the government health clinic, the catholic mission hospital, and the private retired nurse. Most of the traditional healers were herbalists, though some practiced divination as well. Informants determined whether a person who administered the treatment was considered a traditional healer (*wul a fil-i*) by people in Kom. When a caretaker sought treatment from someone outside of the compound, they did so most often because they knew the person had a reputation for curing illnesses. We coded this as "going to a traditional healer." If a specialist lived in the sample compound and considered him or herself a traditional healer, the treatment was coded as *traditional healer* rather than as *home remedy*.

We coded treatments as *clinic, hospital,* or *nurse* if a patient visited one of these medical establishments. We considered any medication that laypeople purchased as the

result of the visit to be part of that treatment and not as a separate pharmaceutical treatment.

Since laypeople administer treatment regiments over a particular time period, treatment modalities often overlapped. For example, some patients took chloroquine while simultaneously drinking an herbal remedy prescribed by a traditional healer. Instead of documenting the overlap of treatments, however, we collected (what we assumed to be) accurate data on the *order* in which laypeople started treatments. Young (1980) used the same approach. By using the point at which a treatment is begun, we can better understand the decision process. We cannot get inside peoples heads, but we can assume that the order in which people begin treatments approximates the order in which laypeople select treatments.

Analysis of Sequential Data

Sequential data provides a wealth of information about health-care practices. Each sequence is composed of an ordered series of treatments. Sequence length can vary from one to seven treatments, or even more if some treatments are repeated. If we restrict the number of treatments to seven, there are up to seven *positions* (first, second, ... seventh) that can be filled. We represent sequences as an ordered series of letters where each letter represents one of the seven treatment modalities. Figure 6–1 shows several sequence examples. Sequence (1) represents a caregiver who first waited 24 hours, then tried a home remedy, then gave a pharmaceutical drug, then visited a traditional healer before the illness was finished.

There are three units of analysis for describing sequential data. First, we can examine the data at the level of treatment modalities. How frequently do modalities occur in sequences? Are some modalities more prevalent in particular positions? How often do modalities repeat themselves in a single sequence?

Second, we can treat each sequence as a single unit. With seven positions and seven modalities that can fill each position, there are 960,800 unique sequence combinations.[1] Which sequences occur and how often? How long are the observed sequences? How similar are the sequences to each other? That is, how similar are sequences one and three in Figure 6–1, when sequence one has four treatments and sequence three has seven?

Third, we can examine the relationships between adjacent treatments in a sequence, — that is, the *transition* from one treatment to the next treatment in the series. We want to know how likely a caregiver is to go from one modality to another modality. For example, of the seven times that a pharmaceutical treatment occurs in Figure 6–1, 43% of the time the treatment is followed by *clinic*. Our medical decision model initially assumes that laypeople's selection of prior treatments affects their selection of later treatments. To validate this assumption, we want to know the rates of transition over positions. That is, in the early stages of the process, are the rates of transition different from those observed at later stages?

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[1] There are 7 sequences with only one treatment, 47 sequences with 2 treatments, 343 sequences with 3 treatments, etc. Summing these combinations, there are 960,800 combinations.

In the results below, we examine each of the three units of analysis: modalities, sequences, and transitions.

Results

Modalities

There are two ways to measure modality frequency. We can ask, "What are the odds that a modality will occur in a given treatment sequence?", in which case we are interested in whether the modality occurred or not. We are not interested in *how many times* the modality was used in a particular episode. Most studies of behavior, simply record whether a treatment was used or not. We can ask, "What are the odds that a modality will occur at all?" This gives more weight to modalities that occur multiple times in a single treatment sequence. Here, the frequency of a modality's occurrence is determined by the total number of treatments rather than by the total number of illness episodes. I explore both below.

Frequencies by illness episodes

Figure 6–2 and Table 6–1 show that the most common event is for people to wait 24 hours before administering any kind of treatment. In almost 60% (270 out of 454) of the illness episodes reported, laypeople said they waited before doing anything. In these cases at least, people do not react immediately to illnesses, even after recognizing the illness.

The most common treatments were pharmaceuticals (55.7%) and home remedies (46.5%). Laypeople consulted traditional healers in only 14.8% of illnesses episodes. They consulted either the health clinic, the local nurse, or the hospital in only 10.1% of the episodes. When I dropped waiting and combined pharmaceutical and home remedies into a single category of home treatments, 83% of the illnesses are treated at home. This corroborates Kroeger's (1983a) findings that people treated 80% of illnesses within the household. Only 22.5% of the 454 illness episodes involve any kind of treatment outside the home. Percentages do not total to 100% because laypeople often use multiple treatment modalities while trying to cure an illness.

Frequencies by treatments

Of the 454 illness episodes reported, laypeople used between one and seven treatments. However, all but one illness episode required fewer than six treatments with an average of 2.16 treatments per episode (std 0.90).[2] This average includes *waiting* as a separate treatment modality. Not counting *waiting*, the average sequence length is 1.55 (std 0.85).[3] Figure 6–3 shows that waiting accounts for almost 30% of all treatment strategies. Considering that we were only looking at waiting at the beginning of the

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[2] Although we consider the sequence that required 7 treatments to be an outlier, we included it in our calculation of sequence length. The sample size is all the 454 illness episodes.

[3] This calculation is based on all 454 illness episodes. By eliminating waiting as a separate treatment modality, 30 illness cases go untreated. In these thirty cases, I considered sequence length to be 0.

treatment sequence and not throughout the entire sequence, this is a conservative estimate.

Figure 6–4 shows the frequencies of modalities if we do not consider waiting as a separate treatment modality. Pharmaceutical and home-remedies together account for almost 80% of all treatments used. These two modalities represent the treatments that take place within the compound. The remaining treatment modalities, (*traditional healers, clinic, nurse* and *hospital*) account for the remaining 20% of all reported illness treatments. Again, this is similar to Kroeger's findings in 1983.

Modality repetition within sequences

As already noted, laypeople often use a single modality at various positions within a treatment sequence. A mother might first try a pharmaceutical drug, then go to a traditional healer, then try another pharmaceutical product, then go to the clinic. I calculated the rates of modality repetition by counting the number of times a modality occurred more than once in a sequence and divided it by the total number of illness cases where the modality was used. Figure 6–5 shows the results. Except for pharmaceutical products, most of the modalities have repetition rates between 20% and 25%. That is, if a layperson uses a modality once, the odds that they will use it again are about one in four.

The odds take into consideration the length of the sequence, as well as the possible modalities to chose from. There is a greater probability for repetition in longer sequences than in shorter ones. With four modalities and four positions, the likelihood of

a repetition occurring randomly in any sequence is over 80%.[4] Repetition rates between 20% and 25% are significantly lower than chance. This indicates that people avoid repeating treatments from the same modality and seek variety. They try one thing, then move on to another modality. We do not know if laypeople are waiting to see the results of each treatment before trying another treatment, or if they try treatments as they become available. The lack of repetition is also an indicator that choices made in the initial stages of the decision-making process affect choices made later in the process.

Laypeople are almost half as likely to use a pharmaceutical product twice as they are to repeat some other remedy. Laypeople appear to try a pharmaceutical only once and then resort to other treatments. There could be several reasons for this: a) Laypeople do not have as much faith in pharmaceutical drugs as a whole and are not willing to try again (this could be due to lack of lay knowledge about pharmaceuticals); b) laypeople use a pharmaceutical only as a first resort and then resort to other remedies, or c) laypeople have more faith in others than in themselves to cure illnesses.

Sequences

Sequences are composed of treatments in various positions. There are various ways of describing sequences, including sequence length, modality by positions, and unique sequences.

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[4] There are 4 sequences with 1 treatment, 16 with 2 treatments, 64 with 3 treatments, and 256 with four. If you include the sequence that uses no treatments at all, there are 341 possible treatment combinations. Of these 341 combinations, 275 (81%) contain at least repetitions of at least one treatment. If the data were random, we would expect to find much higher rates of repetition than we do.

Sequence length

Figure 6–6 shows the rate at which sequence length declines. The graph represents the percentage of all illness episodes (N=454) that have treatment lengths at least as large as shown. For example, 93.4% had at least one treatment administered. (The remaining 6.6% of the total illnesses are those to which laypeople did not administer any type of treatment.) Laypeople treated almost half of all illnesses with 2 treatments or less. And only about 10% of all episodes are managed with 3 or more treatments.

Since we did not consider chronic illnesses (illnesses that lasted for more than three weeks), these do not represent all the illnesses in Kom. The onset of chronic illness, however, is a relatively rare event. During our 5-month data collection period, we found only 14 illness episodes that lasted for more than three weeks. This is not to say that chronic illness is uncommon in Kom. It is simply that the onset of acute illness is more common than the onset of chronic illness.

Modalities by position

What treatment modalities are likely to occur first, second, third, and fourth in a treatment sequence? Figure 6–7 shows the percentages of modalities for each position. The most notable change in frequency is that of waiting. Since we only considered waiting 24 hours at the beginning of an illness episode, we expected to see this rapid drop in the use of waiting as a strategy over positions.

Figure 6–8 depicts the same treatment orderings but calculates modality usage based only on the frequencies of *nonwaiting* modalities.[5] The graph shows that at the first position, laypeople are more likely to select a *pharmaceutical* than any other *nonwaiting* modality. Pharmaceuticals were selected 50.5% of the time, followed by home remedies (37.3%), traditional healers (6.0%), and biomedical practitioners (6.0%). At the second

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[5] There are two ways of "dropping" waiting in sequences. One way is to leave the modality in the sequence as a place holder and calculate proportions based only on non-modality treatment frequencies. This technique does not change the position of non-modality treatments. The second approach is to eliminate the waiting modality completely and recalculate the treatment sequence. This technique shortens the sequence length and changes the position of some of the non-waiting modality treatments. I use the former approach because waiting is an important aspect of treatment sequence. Evidence for this decision will be demonstrated later in this chapter. The two approaches reveal the same general approaches. See Figure 6–9 for a comparison.

Figure 6–9 shows that of the 424 illnesses where laypeople used at least one treatment, they selected a pharmaceutical 48.8% of the time as their first choice. They selected a home remedy 37.5% of the time, and either a traditional healer or a biomedical practitioner 8.2% or 5.2% of the time respectively. In the 222 illnesses where laypeople used at least two treatments, their preferred second choice was home remedies rather than pharmaceutical products. Of the 47 episodes where laypeople used at least 3 treatments, all four treatment modalities have similar probabilities of being selected as the third choice ranging between 21.3% and 27.7%. The most common third choice for treatment is biomedical practitioners. There were only 9 episodes where laypeople used at least four treatments. Here the most common choice is home remedy, followed by biomedical practitioners then pharmaceutical products and traditional healers.

There are several noticeable patterns that arise in Figure 6–9. First, laypeople tend to use pharmaceutical products less and less over time. They initially try pharmaceutical but as decision-making process proceeds, they rely less and less on such options. In contrast to the decline in pharmaceutical products is an increase in use of biomedical practitioners and an increase in traditional healers. Home remedies do not fall as drastically or as steadily as pharmaceutical, but over time maintain are relatively consistent usage.

position, informants selected pharmaceuticals 43.2%, home remedies 39.4%, traditional healers 11.2%, and biomedical practitioners 6.2% of the time.

As the decision-making processes unfolds, the proportions of modality usage change. The use of pharmaceuticals drops off dramatically, while the use of health care providers outside the compound (both traditional and biomedical) increases steadily. The use of home remedies remains stable between 35% and 40%. Figure 6–8 shows that people are more likely to begin pharmaceutical treatments early in the decision-making process and ignore them later on. As the illness progresses, laypeople are more likely to seek care outside the household, either from traditional healers or from biomedical practitioners. Laypeople are likely to start home remedies at any point during the illness.

Unique sequences

Of the 960,800 unique sequences, we observed 78 in 454 episodes of illness. The sequences are listed in Table 6–2. If sequences occurred at random, we would expect to find a lot more sequences than the 78 we found.

Since 98% of the 454 observed sequences used fewer than five treatments, I converted the sequence data to a shorter version that considered only four positions. I treated *waiting* as a separate modality, and combined the government health clinic, hospital, and nurse into a single modality. This reduced the number of modalities from seven to four. Four positions, with four possible modalities means that decision makers can behave in 341 unique ways. Of these of 341 possible sequences only 54 occur in the 454 episodes, or just 15.8% of the possible combinations. Table 6–3 shows the 54

sequences. Both the long and short versions of the sequence data suggest that laypeople do not select treatments randomly.

The reported frequencies of all the unique sequences are highly skewed. Figure 6–10 presents the scree plots of both the long and short versions of the behavioral sequence data. The long version of these data uses all seven positions and all seven treatment modalities. The shorter version uses only four positions and four modalities. The plots of both versions of the sequence data demonstrate the same drastic drop in frequencies. Tables 6–2 and 6–3 show that for either of the sequence representations, over half of the unique sequences were reported only once. The 15 most-commonly used sequences account for 77.8% of all long treatment sequences and 89.0% of all short sequences. The 25 most-commonly used sequences account for 86.1% of all long treatment sequences and 93.6% of all short treatment sequences. Five treatment sequences account for almost 50% of the 454 behavior patterns for the long version, and only three patterns account for almost 50% of the behavior in the short version. These data suggest that there is not nearly the amount of variation in treatment behavior as we might think.

Similarities between sequences

Given a limited number of patterns that people use, we can ask whether treatment patterns are similar to each other. For example, is the treatment sequence *pharmaceutical -- home remedy* similar to or different from the sequence *home remedy -- pharmaceutical*? Both sequences would be different from the sequence *traditional healer -- go to clinic -- go to hospital*.

Optimal matching is a method for measuring resemblances between sequences (Forrest and Abbott 1990). The measures of resemblance can then be used to cluster and scale the sequences into categories or spacial patterns. Optimal matching compares sequences that are built up from a limited number of modalities and produces a proximity measure between sequences. The similarity measure is normalized by dividing by the largest sequence length of every pair compared. The sequences can be of the same or of different lengths. The measure is conceptualized as the number of insertions, deletions, or substitutions it takes to change one sequence into another. Certain types of substitutions may be more drastic than others. The method requires a table of substitution costs which I derived from the triad test of the six major treatment modalities (*home remedy, pharmaceutical, clinic, nurse, hospital, and traditional healer*).

The triad test measures laypeople's perceptions of the similarity between treatment modalities. There was no cultural consensus among the 23 informants who did the triad test regarding similarity among treatment modalities (Romney et al. 1986). Cultural consensus is a construct that measures the agreement between individuals (Romney et al. 1986). The ratio between the first and second eigen values was 1.55, indicating that a single factor does not account for most of the variance in the data.

Using multidimensional scaling the similarity among items could be plotted in one dimension with a stress of 0.129 (shown previously in Figure 5–5). The scale probably represents a scale of perceptions of treatment costs. In Kom, as in many rural areas, home remedies are the least expensive and hospitals are the most expensive treatment options available. A single-link cluster analysis of the triad data shown in

Figure 6–11 places the six modalities in two groups. One group consists of the health clinic, nurse, and hospital. The other group contains traditional healer, home remedy, and pharmaceutical products. The first group represents treatments administered by organized professional practitioners. The second group represents those that are administered in the compound or by less organized traditional health providers.

The scale and cluster results are open to interpretation. Although ethnographic data support my interpretation, I did not formally test the dimensionality or the grouping principles (with PROFIT analysis, for example). For our purposes, however, the triad data are sufficient for generating a substitution cost table. In a cost table, we do not need to know *why* people thought that the modalities were similar. We just need to know *how much* they thought the modalities were alike or different.

Optimal matching created similarity measures among the 59 unique treatment sequences that are produced if we eliminate the waiting modality. A 3-dimensional scaling of this 59 X 59 matrix has a stress of 0.19. The first two dimensions are plotted in Figure 6–12. Dimension 1 appears to represent a traditional–modern continuum, while dimension 2 depicts a continuum from remedies given at home to care seeking outside of the compound. Figure 6–13 shows dimensions 2 and 3. Dimension 3 appears to represent a transition from those illnesses that start with western treatments (*pharmaceutical, clinic, nurse, or hospital*) to those illnesses that started with non-western remedies (home remedies and traditional healers).

I also ran an optimal matching analysis on the shorter version of the treatment sequences. In the shorter version, I only considered 4 modalities: home remedy,

pharmaceuticals, traditional healers, and western practitioners. I also only included the 22 sequences that were reported more than once. Figure 6–14 shows a average-link cluster analysis of the optimal scaling data. The cluster analysis identifies four major categories of sequences identified as A, B, C, and D in Figure 6–14. Group A is composed of sequences that begin with a home remedy and then progress to other treatments including pharmaceuticals and western practitioners. Group B, is composed of sequences that start with pharmaceuticals and move to home remedies. Group C is composed of sequences that resort to traditional healers at some point in the decision making process. Group D is composed of sequences that emphasize western medical practitioners.

The multidimensional scaling plot of the shorter version is similar to that of the longer version. Both require at least three dimensions to reduce the stress to an acceptable amount.

Transitions

How do caretakers move from one treatment modality to another during the decision-making process? Given that a caretaker has just tried treatment X, what is the probability he or she will next try treatment Y? Table 6–4 shows the transition frequencies between treatment modalities that occurred in the 454 reported illness episodes. The table represents the number of times that caretakers moved from a row treatment modality to the column treatment modality.

Figure 6–15 is a graphical representation of this transition matrix and indicates the paths by which caretakers moved from one modality to another. The arrows at the end of each line indicate the direction of the movement. For example, the connection between

home remedy and nurse is unidirectional. This means that there was at least one case where a caretaker tried a home remedy then sought the aid of the nurse as the next treatment. However, there were no cases in our sample where a caretaker went first to the nurse and then used a home remedy as the next treatment. The looped arrows in Figure 6–15 indicate that in at least one illness episode, caretakers repeated the modality. The only modality that does not repeat itself is nurse.

Figure 6–15 shows nine modalities (seven treatment modalities, plus *begin* and *end*). There are 64 possible transitions.[6] However, in our sample of reported behavior, only 44 (69%) of the possible transitions actually occur. If we do not count the waiting modality, 35 of the possible 49 (71%) occur. This suggests that individuals are avoiding particular treatment transitions and that previous treatment choices influence sequential choices.

Figure 6–16 shows the same nine modalities as in Figure 6–15, but here, a line is drawn only if the transition represents at least 5% of the total transitions from the originating modality. The 5% rule is only one of many criteria we could use to determine what connections are important and which are not. One way is to look at all the instances where people use treatment X and then ask "From X, what percent of the instances proceed to Y?" We establish simple cutoff criteria for determining whether to include the connection in the graphic.

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[6] Although there are theoretically 81 connections between 9 items, 17 of the connections are impossible, namely the connections from each of the 7 treatment modalities to *begin* and from *end* to each of the 7 modalities.

In this case, a caretaker has 9 possible choices from any X (including repeating X). This means that if the selection were random, each Y would have an 11% chance of being chosen. I chose 5% as our cutoff criteria because this represented a 50% lower percentage than chance. This is a conservative measure of path significance.Although the 5% criterion is not very strict, it reduces the number of connections from 44 to 25 (56%).

The lines consequently represent the major transition paths between modalities. For example, there is no line drawn from *begin* to *traditional healer*. This indicates that laypeople did not select traditional healers as their first choice in more than 5% of the reported illness cases (N=454). There are no directed lines connecting other modalities with nurse. This indicates that there are no particularly strong treatment sequences that might lead a caregiver to the local nurse.

At an aggregate level, Figure 6–16 demonstrates the general transition patterns as the decision process unfolds over time. In the first stage, laypeople try to treat the illness in the compound. People are likely to wait, use pharmaceutical products, or apply home remedies to an illness before they do anything else. In fact, in some senses, these initial treatments applied in the compound could be construed as prerequisites for seeking care outside the compound.

In almost 50% of the illness episodes, a single home-based treatment is the only treatment that has to be applied before the illness episode is concluded. In these cases, laypeople perceive the treatment as being sufficient for stopping the illness. In other illness cases, however, the home-based treatment is only the initial entry point to a complex decision process. From the initial entry point, there are several general

strategies. One tactic is to continue to try different (or the same) treatment modalities within the compound. The second strategy is to seek care outside of the compound.

The major strategy for seeking care outside the compound is through traditional healers. The immediate predecessors to traditional healers tend to be either *waiting* or *pharmaceuticals*. There are no major transition paths from pharmaceuticals or home remedies to any of the three western medical facilities. This is not to say that say that people do not take pills and then go to the clinic, or take pharmaceutical drugs and then go to the hospital. It simple means that taking pills does not tend to steer laypeople toward either the clinic or hospital. Pharmaceutical products can be purchased from small stores or traveling vendors without a prescription and are closely associated with other treatments used within the household.

Figure 6–16 also shows that both traditional healers and the clinic tend to hold transitional positions in treatment sequences. Laypeople use both modalities in the middle of sequences. It is not surprising to see laypeople go to a healer after waiting or using a pharmaceutical and then return to pharmaceuticals or move on to the clinic. Laypeople tend to go to clinics after first having visited a traditional healer. From the clinic they are apt either to return to another traditional healer, try a home remedy, or move to the hospital. In contrast to clinics and traditional healers, the nurse and the hospital tend to occur at the end of treatment sequences. For most people who seek the aid of a nurse, this is the last treatment. There are some people who try pharmaceuticals after visiting the hospital, but these cases are far outnumbered by the cases that end after the hospital visit.

We can determine which modality is the most central by counting the number of arrows that move into it. We find that pharmaceuticals, home remedies, and traditional healers are the most central in treatment sequences. Waiting tends to act as a gatekeeper by having more arrows going out than coming in. Clinic has the most arrows going out.

Figure 6–16, however, is not normalized for each modality's overall frequency. Modalities that laypeople use a lot have a higher probability of being selected at any given point in a sequence than modalities that are less common. As a result, we should not be surprised that such popular modalities as pharmaceuticals and home remedies play a prominent role in the transition matrix. We can eliminate this bias by taking into account row and column marginals. We create a matrix of discrepancies where each cell represented the observed frequency minus the expected frequency, divided by the expected frequency. We then dichotomize this matrix using an arbitrary cutoff. Table 6–5 shows the results when the cutoff is set to -0.1. The -0.1 cutoff considers all connections that are no more than 10% below the expected frequency value. The cutoff eliminates all connections that are less than we would expect given the modality's overall frequency. Table 6–5 is shown graphically in Figure 6–17. The lines indicate that the frequencies were at least as great as expected given the overall frequency of the modalities.

Figure 6–18 uses the same approach but we set the cutoff at 0.1. This means that only connections that were at least 10% greater than expected are shown. A lot of the connections seen in Figures 15 and 16 disappear because they were expected given the large frequencies of the modalities involved. All treatments have a higher than expected rate to be the last treatment (represented in Figure 6–15 and 6–16 as *end*). This is due to

the desire to cure the illness with as few remedies as possible. There is a stronger than expected tendency for caretakers to go from home remedies to nurse. Some of this could be due to the small number of cases where informants reported using the nurse.

There is a significant link between traditional healers and the clinic. This link goes in both directions. This suggests that people have a tendency to try one then go to the other. Likewise, there is a significant number of people that go from traditional healer to the hospital. It is important to note that the opposite, that caretakers move from the hospital to the traditional healer, does not occur.

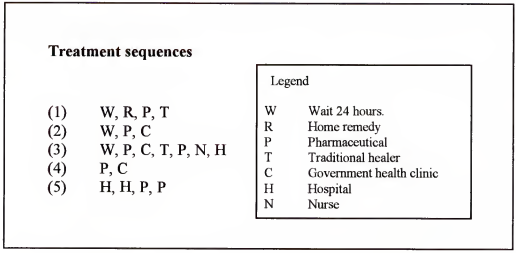


Figure 6–1 Examples of treatment sequence data.

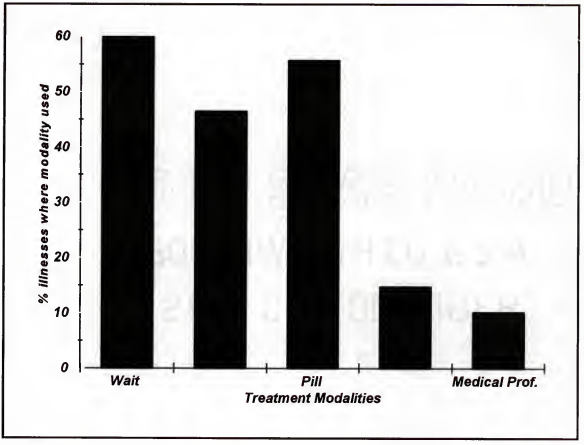


Figure 6–2 Use of treatment modalities in 454 illness episodes.

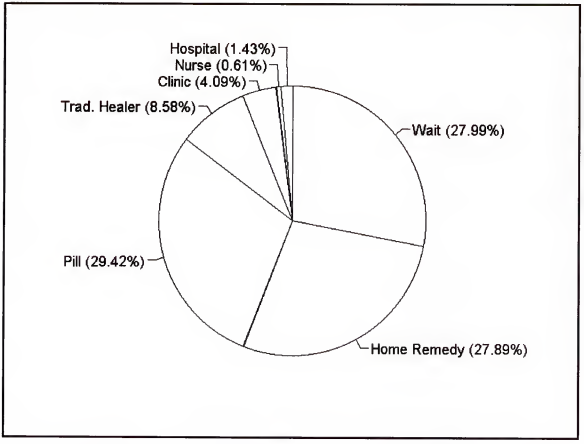


Figure 6–3 Percentage of modality use for all treatments (N=979).

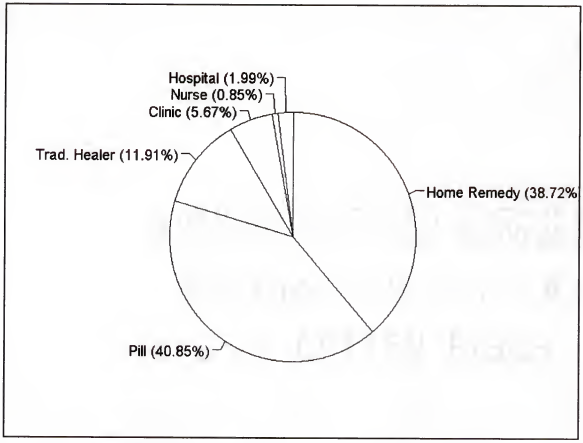


Figure 6–4 Percentage of modality use for all non-waiting treatments (N=705).

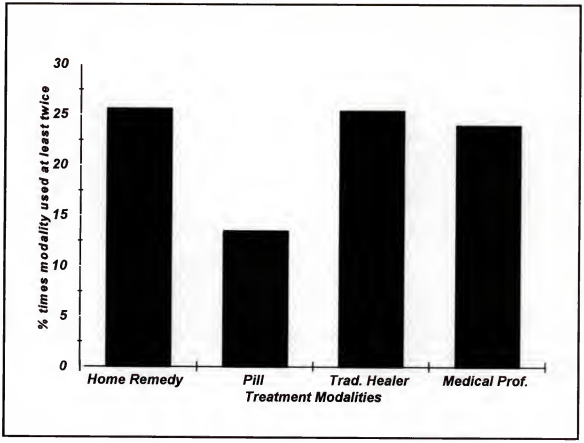


Figure 6–5 Percentage of times that modalities are used more than once in a treatment sequence (N=454).

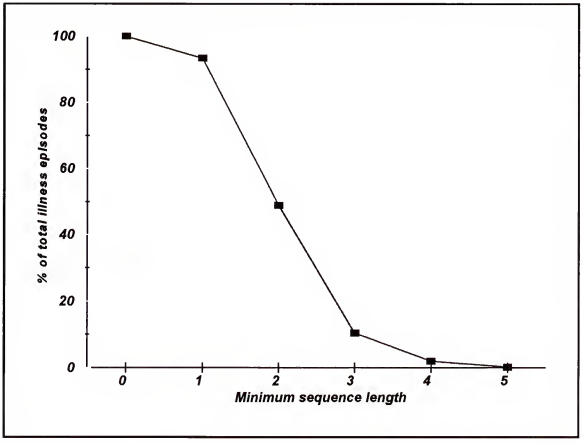


Figure 6–6 Scree plot of treatment sequence length (N=454).

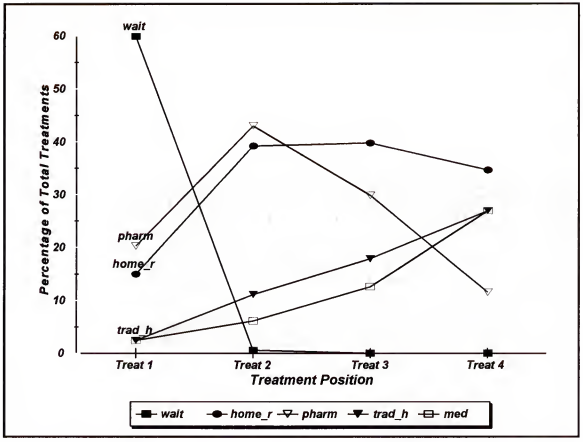


Figure 6–7 Percentage of all modalities used by treatment position (N=454).

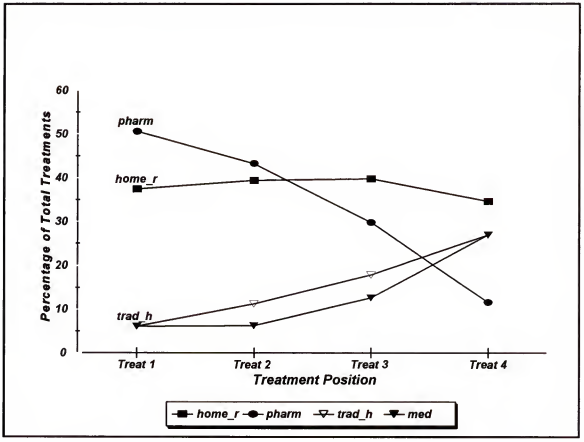


Figure 6–8 Percentage of non-waiting modalities used by treatment position where waiting is considered a place holder (N=424).

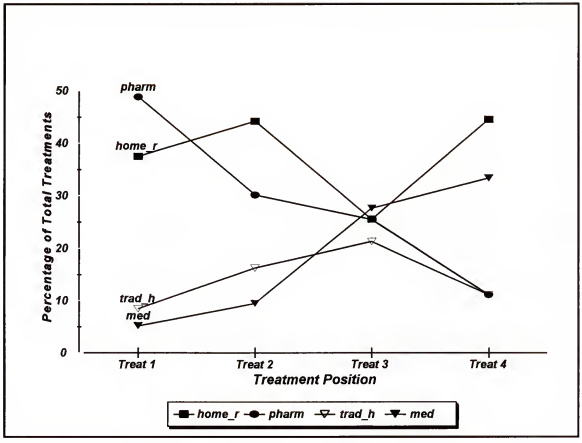


Figure 6–9 Percentage of non-waiting modalities used by treatment position where waiting is not considered a place holder (N=424).

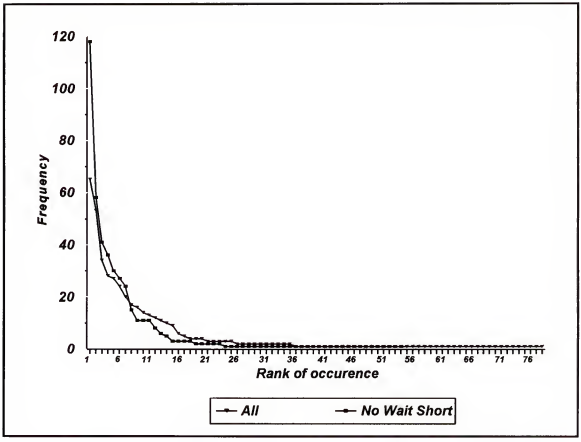
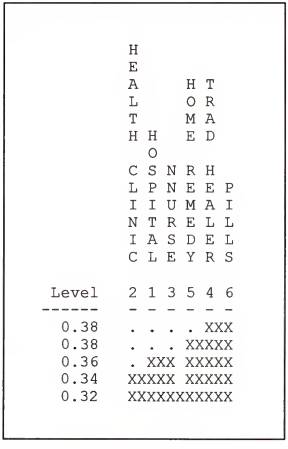


Figure 6–10 Scree plot of unique sequences as measured using both long descriptors with all modalities and short descriptors without the waiting modality (N=454).


H
E
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C L E Y R S
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0.38 . . . XXXXX
0.36 . XXX XXXXX
0.34 XXXXX XXXXX
0.32 XXXXXXXXXXX

Figure 6–11 Hierarchical cluster analysis (average link method) of similarity between treatment modalities based on triad data (N=23).

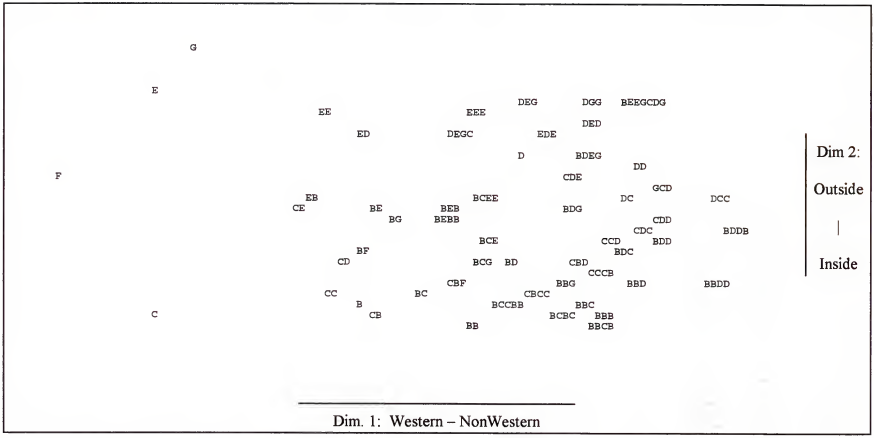


Figure 6–12 Multidimensional scaling of treatment sequences (Dimensions 1 and 2).

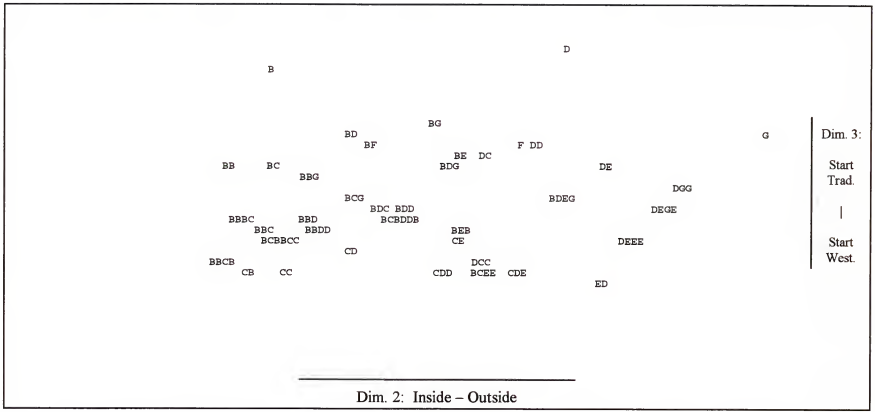


Figure 6–13 Multidimensional scaling of treatment sequences (Dimensions 2 and 3).

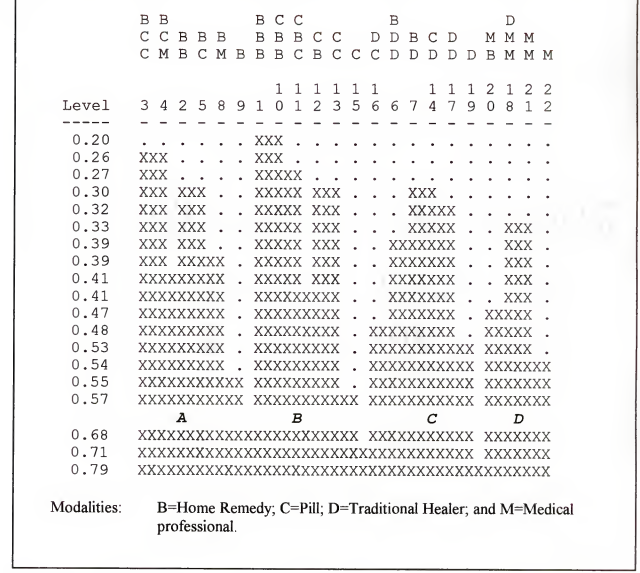


Figure 6–14 Hierarchical cluster analysis (average link method) of similarity between treatment sequences based on optimal scaling of 454 illness episodes.

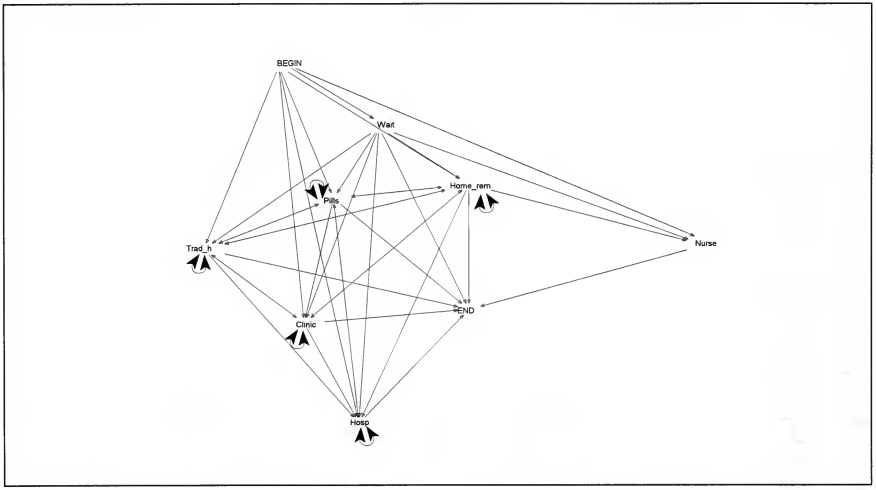


Figure 6–15 Transitions between treatment modalities where lines represent frequencies greater than zero (N=434).

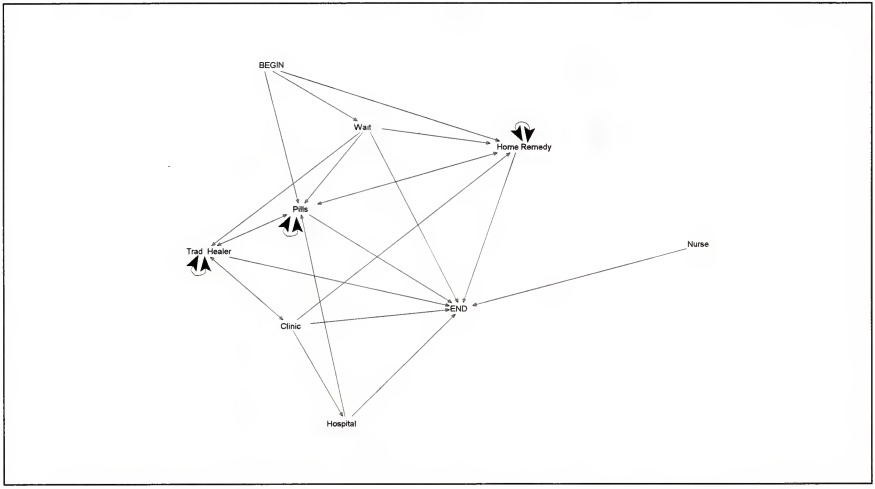


Figure 6–16 Transitions between treatment modalities where lines indicate transitions greater than 5% (N=454).

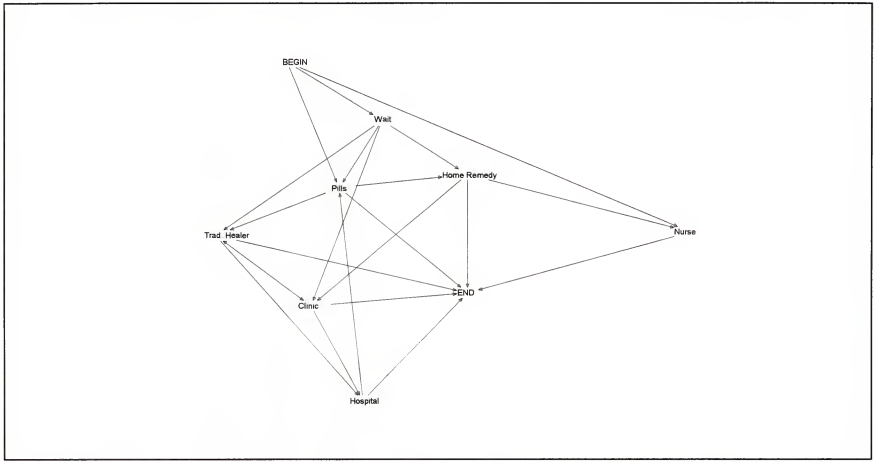


Figure 6–17 Transitions between treatment modalities where lines indicate transitions that were greater than a cutoff set at 10% below what was expected by chance (N=454).

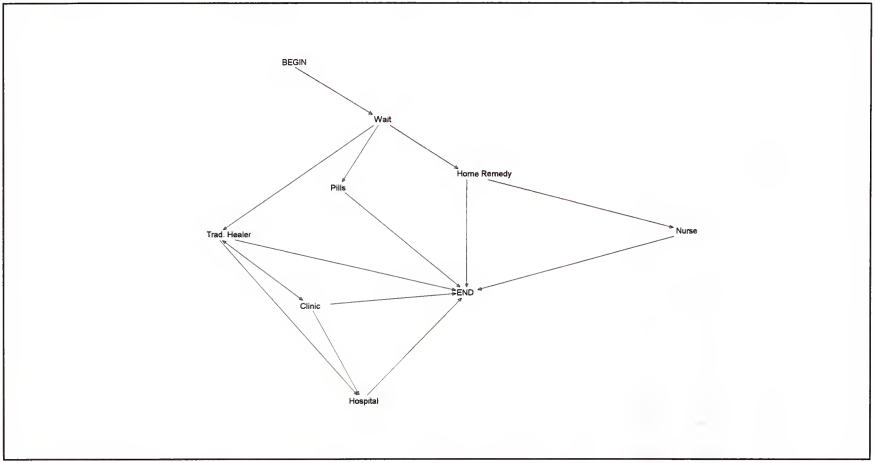


Figure 6–18 Transitions between treatment modalities where lines indicate transitions that were greater than a cutoff set at 10% above what was expected by chance (N=454).

Table 6–1 Modality use by illness episodes (N=454).

	Illness episodes where treatment modality used at least once		Illness episodes where treatment modality used more than once	
Treatment Modalities	Frequency	%	Frequency	%
Waiting	272	59.9	2	0.7
Home Remedies	211	46.5	54	25.6
Pill	253	55.7	34	13.4
Traditional Healer	67	14.8	17	25.4
Professional Practitioners	46	10.1	11	23.9
Clinic	32	7.0	7	21.9
Nurse	6	1.3	0	0.0
Hospital	12	2.6	2	16.7

Table 6–2 Unique treatment sequences of illness episodes (N=454).

Rank	Sequence	Frequency	%	Cumulative %
1	ac	65	14	14.3
2	c	53	12	26.0
3	ab	34	7.5	33.5
4	a	28	6.2	39.7
5	acb	27	6	45.6
6	b	24	5.3	50.9
7	abb	20	4.4	55.3
8	abc	17	3.7	59.0
9	bb	16	3.5	62.6
10	cb	14	3.1	65.6
11	acc	13	2.9	68.5
12	ad	12	2.6	71.2
13	cc	11	2.4	73.6
14	bc	10	2.2	75.8
15	add	9	2	77.8
16	acd	6	1.3	79.1
17	cd	5	1.1	80.2
18	abbb	4	0.9	81.1
19	ac	4	0.9	81.9
20	dc	4	0.9	82.8
21	abd	3	0.7	83.5
22	bc	3	0.7	84.1
23	cbc	3	0.7	84.8
24	d	3	0.7	85.5
25	cb	3	0.7	86.1
26	aa	2	0.4	86.6
27	abdd	2	0.4	87.0
28	abc	2	0.4	87.4
29	acc	2	0.4	87.9
30	ag	2	0.4	88.3
31	bbb	2	0.4	88.8
32	bcc	2	0.4	89.2
33	dd	2	0.4	89.7
34	e	2	0.4	90.1
35	f	2	0.4	90.5
36	abbc	1	0.2	90.8
37	abbcb	1	0.2	91.0
38	abbd	1	0.2	91.2
39	abcb	1	0.2	91.4
40	abcc	1	0.2	91.6

Table 6–2 Continued.

Rank	Sequence	Frequency	%	Cumulative %
41	abcg	1	0.2	91.9
42	abdeg	1	0.2	92.1
43	abebb	1	0.2	92.3
44	abf	1	0.2	92.5
45	acbb	1	0.2	92.7
46	accd	1	0.2	93.0
47	acdd	1	0.2	93.2
48	ace	1	0.2	93.4
49	adc	1	0.2	93.6
50	ade	1	0.2	93.8
51	aded	1	0.2	94.1
52	adgg	1	0.2	94.3
53	aed	1	0.2	94.5
54	aeee	1	0.2	94.7
55	af	1	0.2	94.9
56	bbdd	1	0.2	95.2
57	bbg	1	0.2	95.4
58	bcbc	1	0.2	95.6
59	bcee	1	0.2	95.8
60	bdc	1	0.2	96.0
61	bddb	1	0.2	96.3
62	bdg	1	0.2	96.5
63	beb	1	0.2	96.7
64	beegcdg	1	0.2	96.9
65	bf	1	0.2	97.1
66	bg	1	0.2	97.4
67	cbb	1	0.2	97.6
68	cbd	1	0.2	97.8
69	cbf	1	0.2	98.0
70	cccb	1	0.2	98.2
71	cdc	1	0.2	98.5
72	cde	1	0.2	98.7
73	dcc	1	0.2	98.9
74	deg	1	0.2	99.1
75	ede	1	0.2	99.3
76	ee	1	0.2	99.6
77	egc	1	0.2	99.8
78	gcd	1	0.2	100.0

Sequence: a = wait 24 hours; b = home remedy; c = pharmaceutical; d = traditional healer; e = clinic; f = nurse; and g = hospital.

Table 6–3 Unique treatment sequences of illness episodes as described with selected treatment modalities (N=454).

Rank	Sequence	Frequency	%	Cumulative %
1	c	118	26	26.0
2	b	58	13	38.8
3	cb	41	9	47.8
4	bb	36	7.9	55.7
5	none	30	6.6	62.3
6	bc	27	6	68.3
7	cc	24	5.3	73.6
8	d	15	3.3	76.9
9	cd	11	2.4	79.3
10	dd	11	2.4	81.7
11	m	11	2.4	84.1
12	bm	8	1.8	85.9
13	bbb	6	1.3	87.2
14	dc	5	1.1	88.3
15	bd	3	0.7	89.0
16	cbc	3	0.7	89.7
17	mb	3	0.7	90.3
18	mm	3	0.7	91.0
19	bcc	2	0.4	91.4
20	bcm	2	0.4	91.9
21	bdd	2	0.4	92.3
22	cbb	2	0.4	92.7
23	dmm	2	0.4	93.2
24	bbc	1	0.2	93.4
25	bbcb	1	0.2	93.6
26	bbd	1	0.2	93.8
27	bbdd	1	0.2	94.1
28	bbm	1	0.2	94.3
29	bcb	1	0.2	94.5
30	bcbc	1	0.2	94.7
31	bcmm	1	0.2	94.9
32	bdc	1	0.2	95.2
33	bddb	1	0.2	95.4
34	bdm	1	0.2	95.6
35	bdmm	1	0.2	95.8
36	bmb	1	0.2	96.0
37	bmbb	1	0.2	96.3

Table 6–3 Continued.

Rank	Sequence	Frequency	%	Cumulative %
38	bmmmcd	1	0.2	96.5
39	cbd	1	0.2	96.7
40	cbm	1	0.2	96.9
41	cccb	1	0.2	97.1
42	ccd	1	0.2	97.4
43	cdc	1	0.2	97.6
44	cdd	1	0.2	97.8
45	cdm	1	0.2	98.0
46	cm	1	0.2	98.2
47	dcc	1	0.2	98.5
48	dm	1	0.2	98.7
49	dmd	1	0.2	98.9
50	mcd	1	0.2	99.1
51	md	1	0.2	99.3
52	mdm	1	0.2	99.6
53	mmc	1	0.2	99.8
54	mmm	1	0.2	100.0

Sequence: b = home remedy; c = pharmaceutical; d = traditional healer; m = medical professionals.

Table 6–4 Frequency of transitions from one treatment modality to another for all illness episodes (N=454).

	To Treatment Modality:									
From Treatment Modality:	Begin	Wait	Home Remedy	Pills	Trad. Healer	Clinic	Nurse	Hosp.	End	Total
Begin	0	272	68	92	11	8	2	1	0	454
Wait	0	2	91	115	25	8	1	2	30	274
Home Remedy	0	0	56	40	12	8	3	2	152	273
Pills	0	0	52	30	17	3	0	1	185	288
Trad. Healer	0	0	1	8	16	6	0	3	50	84
Clinic	0	0	5	0	3	7	0	4	21	40
Nurse	0	0	0	0	0	0	0	0	6	6
Hospital	0	0	0	3	0	0	0	1	10	14
End	0	0	0	0	0	0	0	0	0	0

Table 6–5 Frequency of transitions between treatment modalities that are more than 10% below the expected frequency value for all illness episodes (N=454).

	To Treatment Modality:									
From Treatment Modality:	Begin	Wait	Home Remedy	Pills	Trad. Healer	Clinic	Nurse	Hosp.	End	Total
Begin	0	1	0	1	0	0	1	0	0	3
Wait	0	0	1	1	1	1	0	0	0	4
Home Remedy	0	0	1	0	0	1	1	0	1	4
Pills	0	0	1	0	1	0	0	0	1	3
Trad. Healer	0	0	0	0	1	1	0	1	1	4
Clinic	0	0	0	0	1	1	0	1	1	4
Nurse	0	0	0	0	0	0	0	0	1	1
Hospital	0	0	0	1	0	0	0	1	1	3
End	0	0	0	0	0	0	0	0	0	0
Total	0	1	3	3	4	4	2	3	6	26

CHAPTER 7
HOW DO ATTRIBUTES OF ILLNESSES, PATIENTS, CAREGIVERS, AND COMPOUNDS AFFECTS WHAT PEOPLE DO?

In this chapter I answer the question, "What determinants best explain home case management behaviors in Wombong?" I specifically look at six aspects of people's sequential treatment behavior. These behaviors include whether or not people use home remedies, pills, healers, or medical professionals (clinic, nurse, hospital), as well as whether or not people wait 24 hours before treating an illness. I also model whether or not treatment sequences include seeking care outside the compound. I explain each of the six behaviors by considering 75 variables from 4 classes of determinants. The classes of determinants include characteristics of illness episodes, patients, caretakers, and compounds. In addition to examining the bivariate relationships between the independent and dependent variables, I build separate multivariate models to predict each of the six treatment practices.

Data Collection

The data for this analysis come from the illness episode survey described in Chapter 3. Over a five-month period, our research team documented primary caregivers' recall of 454 illness episodes. The episodes occurred in a representative sample of 88 compounds. Although some compounds experienced more illnesses than did others, the

compounds are representative of all the compounds in the village. This representativeness allows me to makes statements about the treatment patterns at the village level.

Of the 454 original episodes we collected, I dropped 20 episodes because they were based on recall that was over 14 days old. Most of these 20 cases were collected at the beginning of the five month period. These cases tend to be chronic (i.e., lasting more than three weeks). Caretakers in these episodes are more likely to use traditional healers, the clinic, and the hospital. I dropped an additional case because some of the behavioral data was lost during data entry. I used the remaining 433 cases in my analysis.

Fourteen of the 433 cases lasted longer than three weeks (at which point we stopped collecting data on treatment behaviors). Of the 14 cases, 41% sought treatment from a traditional healer while only 12% of the other 419 cases did so (pooled variances $t = -3.331$, $df=432$, $p<0.001$). The 14 cases, however, are not significantly different on the use of any other treatment. Because of the rarity of using traditional healers, I decided to include these cases in my analysis. The inclusion of these data does not change the outcomes of the analysis.

Dependent Variables

We asked primary caretakers to recall which of six treatment modalities they used first, second, third, etc. From these data, I derived six different dependent variables. For each illness episode, I recorded whether or not caretakers waited twenty-four hours before initiating treatments (WAIT), and whether or not they used a home remedy (HOMEREM) or pharmaceutical (PILL), or sought assistance from a traditional healer

(HEALER). People used the local nurse, clinic, or hospital infrequenty; all the professional medical practitioners are therefore grouped into a single category (MED). To understand the sequences of behaviors, I recorded whether or not caretakers treated the illness entirely within the compound or sought assistance from outside (SEQTYPE).

Table 7–1 shows the univariate statistics for the binary variables. In the first five variables, the value 1 refers to using the modality and 0 refers to not using the modality. In the case of SEQTYPE, 1 refers to going outside the compound and 0 refers to staying inside the compound. In 60% of the illness episodes, caregivers waited 24 hours before beginning treatments. In a little less than half the cases they administered home remedies and in a little more than half the cases they used pharmaceuticals. Caretakers sought assistance from traditional healers in only 13% of the episodes, and in only 9% of the cases, did they seek professional medical attention. Only 21% involved seeking care outside the compound.

To determine how independent variables affect each of the six treatments, I divide the analysis into five sections. In the first four sections, I ask, "To what extent do characteristics of illnesses, patients, caretakers, and compounds help us predict treatment behaviors?" Within each section, I describe the univariate statistics of independent variables, their intercorrelations, and their bivariate associations with each of the six treatment behaviors. I also build multivariate models for each treatment. These simplified models use only the independent variables pertaining to each section. In the fifth section, I ask "To what extend do <u>combinations</u> of classes of determinants help us predict

treatment behaviors?" To answer this question, I combine the simple models into composite models, one model for each treatment behavior.

Analysis Strategy

Due to the large number of independent variables, I use the determinant approach outlined in Chapter 1 and graphically represented in Figure 1–2 to guide my analysis. I follow two simple rules: 1) first consider determinants associated with illnesses, then those associated with patients, then with caretakers, and finally with households; and 2) within each class of dterminants, follow the priority-of-infrastructure rule.

In Figure 1–2, the first rules means moving in a clockwise direction from smaller units of analysis to larger units of analysis. I do not consider variables beyond the household level because they do not account for treatment variation within this one community.

The priority-of-infrastructure rule suggests that external variables (e.g. socio-economic, demographic, and structural) offer better explanations than do internal variables (i.e., cognitive beliefs, attitudes, and intentions). Graphically, this means that I emphasize variables located at the outside of Figure 1–2 more than I emphasize variables closer to the core.

Despite these theoretical guidelines, my research strategy is largely empirical. Within each class of determinants, I first examine the univariate statistics all the independent variables. I then examine the intercorrelation among these variables. When

variables are highly correlated, I select the more external variable to use in the remainder of my analysis.

Next, I use contingency tables (chi-square statistics) and t-tests to explore the bivariate associations between each of the independent variables and the six treatment behaviors. The bivariate associations provide a rich base for observing how characteristics of illnesses, patients, caretakers, and compounds affect treatment behaviors. Much of my analysis is based on these associations.

Although a bivariate analysis is necessary for understanding such behaviors, I ultimately want to build multivariate models for predicting treatments. Since all of the six dependent variables are binary, logistic regression is an appropriate method for analysis. Logistic regression itself, however, does not provide a fixed way for selecting which independent variables belong in each of the six models. As a modeler, I use a strategy that is systematic and replicable for determining which variables belong in each model.

To model a single behavior, I follow a set of iterative steps. For each class of determinants, I use the bivariate analysis to determine which independent variables have a direct affect on the behavior of interest. I exclude all variables with $p>0.1$. For exploratory purposes, 0.1 is a better cutoff for considering a variable as potentially important. I include the remaining variables in the first of three iterations of multiple logistic regression. If a variable has an effect on the dependent variable at the $p<0.2$ level after the first logistic regression, I include it in the second iteration. I retain variables that are significant at the $p<0.05$ level for the third and final iteration. I repeat these steps for each of the four classes of determinants to produce four simplified models for each

dependent variable. For each of the simplified models, I report the odds ratios, 95% confidence intervals, and probabilities for each of the variables. I discuss the significance of the results for each class of determinants.

Finally, to create a composite model for a single dependent variable, I systematically combine the simplified models that are based on characteristics of illnesses, patients, caretakers, and compounds. I begin by adding the simplified model of patient characteristics to the simplified model of illness characteristics. I use three iterations of logistic regression to build a combined model of illness and patient characteristics. I want to know if adding characteristics of the patient significantly increases the explanatory power of the model. I continue the process by next adding characteristics of the caretaker, and finally characteristics of the compound. Ultimately, I obtain a single composite model for each of the six treatment behaviors.

The analysis strategy has advantages and disadvantages. The cutoffs for each of the steps are initially quite liberal. This allows me to consider as many variables as possible in the first cut at the bivariate level of association. Many of these variables, however, are quickly eliminated during the three logistic regression iterations. Ultimately, the process produces composite models of fewer than six independent variables.

By making the analysis process both systematic and iterative, I can generate parsimonious models of treatment behavior. By setting out theoretical guidelines for prioritizing variables, the process is not *ad hoc*. By examining one class of determinants at a time, I can answer "How much do characteristics of illnesses account for variation in

behavior patterns?" as well as, "How much more variation can I explain by considering characteristics of patients, caregivers, and compounds?"

On the other hand, because of the large number of independent variables, I do not systematically consider the interactions among these variables in any of the models. In fact, I only consider variables that have at least some direct association with the treatments of interest. I leave the required path analysis of these data for future work.

To What Extent Do Characteristics of the Illness Help Us Predict Treatment Behaviors?

In order to examine the effect that illness characteristics have on treatment behaviors, we collected data on signs, symptoms, diagnosis, etiology, and perceived severity for each illness episode. For signs and symptoms, we asked primary caregivers to indicate whether patients had experienced any of 14 specific signs or symptoms. These included vomiting, fever, diarrhea, chills, sweat, cough, runny nose, pain, joint aches, head aches, dry lips, sadness, stomach ache, or itching (S_VOMIT, S_FEVER, S_DIAR, S_CHILL, S_SWEAT, S_COUGH, S_NOSE, S_PAIN, S_JOINT, S_HEAD, S_LIPS, S_SAD, S_STOM, S_ITCH). We recorded the answers in a binary format.

Table 7–2 shows that many of the signs and symptoms are intercorrelated. The factor analysis shown in Table 7–3 suggests that there are five general types of illness indicators. These factors correspond to illnesses related to fever, cough/cold, stomach, general malaise, and pain/discomfort. The first three factors are similar to the head, chest, and stomach clusters of illnesses described in Chapter 5. In order to reduce the number of

variables in my analysis, I considered only the symptom that loaded highest on each of the five factors (S_FEVER, S_COUGH, S_DIARR, S_SAD, and S_PAIN).

We also asked primary caregivers for their own diagnosis and etiology of the illness (DIAG & CAUSE). We recorded the answers in an open-ended format and later coded the answers into categories. In some of the cases, informants attributed multiple illnesses or causes to a single episode. In such cases, I only used the first illness term or cause that informants mentioned. I assumed that terms and causes mentioned first were more salient to the informant.

Table 7–4 shows the distribution of illnesses among diagnostic categories. The three most commonly mentioned illnesses (fever, headache, and cough/colds) account for over 70% of all the illness episodes. Illnesses related to the stomach, skin, and accidents were all mentioned less than 10% of the time. The category "Other" included gastric, back ache, eye pain, side pain, and other minor aches and complaints.

In order to justify including both signs/symptoms, as well as illness terms, in the analysis, I explored to what degree signs/symptoms and illness diagnosis overlapped. Table 7–5 indicates that having a symptom does not accurately predict how a caretaker will diagnose an illness. For example, only 45% of those caretakers who reported signs of cough, diagnosed the primary illness as cough, and only 39% of those caretakers who reported signs of fever diagnosed the illness as fever. Of course, when caretakers diagnosed an illness as either cough or fever, 94% and 98% reported the respective signs. This indicates that signs of fever and cough are *sensitive* rather than *specific* indicators of their respective illness categories. In contrast to cough and fever, signs of sadness do not

help us predict how a caregiver will diagnose an illness better than chance. I decided to include illness signs and symptoms, as well as illness diagnosis, in my analysis.

Table 7–6 shows the list of general causes people attributed to illness episodes. Over half the cases were attributed to either climate (sun or seasonality) or to unknown causes. To a lesser extent, people attributed illnesses to overwork, other illnesses, accidents, bad food, destiny, a person's "normal" sickness, or supernatural causes. Supernatural causes included witchcraft and "God's will". I keep some of the less-mentioned causes in the analysis to see if they may have a small but direct impact on particular behaviors. Other causes include old age, poverty, elections, and drunkness.

Table 7–7 shows the degree to which attributed causes and illness categories overlap. Given the distribution of causes attributed to all illness episodes, people attribute cough more to climate and seasonality, and they attribute stomach-related problems more to food and worms than would be expected by chance ($p<0.05$). On the other hand, people's causal attributions to fever mirror the distribution for all illness episodes. Although there is a definite relationship between cause and illness categories, there is not enough of a relationship to justify dropping people's attributions of causation from the analysis.

In addition to signs/symptoms, diagnosis, and causation, researchers have used various measures of severity to predict treatment behavior. In this study, I measure severity in four ways: 1) coding whether or not informants recalled the illness as having fever, cough, diarrhea, sadness, or pain (SEVCNT). Values for SEVCNT range from 0 to 5, with a mean of 2.54 and a standard deviation of 0.95.

2) Coding modifications patients made to their normal behavior (SEVBEH). We asked informants if the patient had failed to go to work or school, had stayed in bed, or had avoided the sun. SEVBEH takes values from 0 to 3, with a mean of 1.62 and a standard deviation of .88. Both SEVCNT and SEVBEH are roughly normally distributed.

3) Coding informants' own assessment of the illnesses episode (SEVEMIC). We asked informants if they thought the illness was weak or strong and coded their responses as binary values, where 0 equals weak and 1 equals strong. Of the 423 people who responded to the question, 32% rated the illness as being strong, while the other 68% felt the illness was weak.

4) Coding the duration of the illness (LAST). Although illness duration is in part related to the treatments that caretakers administer, informants expressed the belief that illnesses that lasted longer were more serious. Duration of illnesses range from 1 to 43 days, with a mean of 6.84 and a standard deviation of 20.96. Unlike the other severity measures, LAST is not normally distributed. The stem and leave plot in Figure 7–1 shows that LAST has a bimodal distribution and tail of outside values greater than 14 days.

Table 7–8 shows the correlations among the four measures of severity. SEVCNT, SEVBEH, and SEVEMIC are weakly and significantly interrelated. The correlations are not strong enough, in my view, to warrant eliminating any of these variables. Duration of illness is not correlated with any of the other measures of severity. This suggests that severity may be a multidimensional construct for informants in Wombong.

Table 7–9 shows the bivariate associations between characteristics of illnesses and the six treatment behaviors. The number of pluses and minuses indicate the direction and strength of the relationships. Interval level variables (e.g. SEVCNT, SEVBEH, and LAST) are tested with a pooled variance t-test; binary variables are tested with χ^2.

The bivariate associations highlight several overall patterns. First, they indicate that signs, symptoms and illness terms are better predictors of waiting and home remedies, while perceptions of causation and severity are better predictors of treatments outside the compound. The use of pharmaceuticals is predicted by all types of illness characteristics, including signs, illness diagnosis, and perceptions of causation and severity. This makes sense from a decision process framework. Signs, symptoms, and illness diagnosis are recognized early in the illness. These are better predictors of behaviors that are used earlier in a treatment sequence. Perceptions of causation and severity require more complex cognitive processing and are therefore more likely to affect behaviors that occur later in treatment sequences. Perceptions of causation and assessments of severity may also be linked to patients' reactions to earlier treatments. Some informants told us explicitly that if home remedies or pills didn't alleviate the illness signs, then they would consider alternative causes for the illness as well as perceive the illness as more serious.

Second, the bivariate relationships suggest that recognition of signs and symptoms and diagnosis of illness play separate roles in predicting treatment behavior. In Wombong, signs of headache or fever and diagnosis of headache or fever both predict the use of home remedies and pills. As the common denominator, signs of fever or headache

appear to influence people's use of pills and their non-use of home remedies. In contrast, signs of cough do not predict any behavior while the diagnosis of cough is significantly correlated with waiting, home remedies and pharmaceuticals. These differences between coughs and fevers suggest that the cognitive process of diagnosing cough as the primary illness entity plays a role in treatment selection above and beyond simply recognizing signs of cough.

Finally, Table 7–9 indicates that there are substitution effects among home remedies, pills and healers, but not between healers and medical professionals. Substitution effects are demonstrated when an independent variable is positively associated with one treatment modality and negatively associated with another treatment modality. For example, both signs of fever and headache predict that people will use pharmaceuticals and not use home remedies. In contrast, people who diagnose an illness as cough will use home remedies and avoid pharmaceuticals. A diagnosis of an illness as being something other a problem associated with fever, headache, cough, skin or stomach, will drive people toward using healers and away from using pills. In Wombong, the commonly held notion that some illnesses are better cured by traditional healers than professional practitioners does not hold. There is no evidence that a single sign or illness diagnosis will increase the likelihood that people seek care from one type of practitioner and avoid the services of the other type.

Multivariate Analysis

The bivariate associations are the initial inputs into the logistic regression models. Table 7–10 shows the simplified models for each treatment behavior. All models are

significant at the $p<0.01$ level. As in the bivariate associations, waiting and home remedies are best predicted by signs and illness diagnosis while the use of healers, medical professionals, or going outside the compound for assistance are best predicted by more complex internal processes associated with attributions of causation and severity.

The model for waiting suggests that on average people are less likely to wait 24 hours when they recognize signs of vomiting or they associate an illness with an accident. People are also less likely to wait if an illness interrupts their normal behavior by confining them to bed and prohibiting them from going to work or school. This confirms Weller et al. (1995) observations in Guatemala that people are more likely to treat an illness that affects the patients ability to work.

The simplified logistic regression model for home remedies uses only illness signs and diagnosis. Caretakers are over 80% more likely to use home remedies when they recognize signs of vomiting or they diagnose the illness as cough. They are over three times as likely to use home remedies for skin illnesses. In contrast, they are almost half as likely to use home remedies for illnesses diagnosed as fever.

The model for pharmaceuticals contrasts with the model for home remedies. For example, signs of fever are strong predictors of a caretaker's use of pharmaceuticals. By y contrast, diagnosing an illness as a cough, stomach ache or some other illness tends to discourage caretakers from using pills. Caretakers are also more likely to use pharmaceuticals when they believe that the illness is caused by climate. The effect of attributing an illness' cause to climate is independent of other illness signs and diagnoses.

The only illness characteristic that predicted people's use of healers was whether an illness was diagnosed as being something other than accident, fever, cough, stomach or headache. In these cases, people were (at least) two-and-a-half times as likely to go to a healer than if they had one of the more common illnesses. Interestingly, informants claimed they knew of healers who cured all of the more common illnesses.

People were less likely to seek assistance from medical professionals if the patient demonstrated signs of headache. They were more likely to seek assistance if the illness was caused by something other than food, climate, work, or other illnesses. Caretakers were more likely to seek professional assistance if the illness required bed rest or prohibited going to work or school. Caretakers were over three times as likely to seek professional assistance if they perceived the illness as being "strong". In general, people were more less likely to seek assistance outside the compound for signs of headache. They were more likely to go outside for "strong" illnesses or for illnesses that last longer.

Some of the stronger relationships in the bivariate analysis disappear in the multivariate analysis. For example, diagnosing an illness as cough is not significant in predicting whether or not people waited 24 hours before beginning treatment. This is in part due to the strong negative correlation between SEVBEH and cough. Headache, SEVCNT and SEVBEH are no longer significant in predicting the use of pharmaceuticals because of their strong association with signs of fever. And the significance of illnesses diagnosed as "other" in predicting whether people seek assistance outside the compound is lost when signs of fever are introduced into the model.

As in the bivariate analysis, the logistic regression models show that illness signs and diagnosis are better predictors of home-based remedies while perceptions of causation and severity are better predictors of treatments outside the compound. The major exception to this pattern is signs of headache which predicts that people will not use medical professionals or seek assistance outside the house.

The logistic regression models also suggest that people act as if they are following both positive and negative rules for selecting among treatments. Consider, for example, people's use of home remedies. The positive rule says, "If the patient is vomiting, or is diagnosed with cough or a skin illness, then administer a home remedy." The negative rule says, "If the patient is diagnosed with fever, do not administer a home remedy." There are also positive and negative rules for pharmaceuticals: "If patient has signs of fever or the illness is caused by climatic conditions, administer a pill" but "If the patient is diagnosed as having cough, stomach ache or some other uncommon illness, do not give a pill." Whether or not people actually hold these rules in their heads and use them to guide their actions is an open question. These simple models, however, provide evidence that illness signs, diagnosis, and causation steer people toward and away from particular treatment modalities. This can be tested wi th further ethnographic research.

Although many researchers have claimed that illness severity plays a major role in treatment selection, its effects on treatments in Wombong remains unclear (Kasl and Cobb 1966b; Young, J. 1981a; Bentley et al. 1992; Bletzer 1993). I had thought that counts of illness signs (SEVCNT), modifications to normal behavior (SEVBEH), duration of illness (LAST), and emic perceptions of illness severity (SEVEMIC) were all

different measures of the same underlying construct. The data, however, suggest that this assumption is wrong.

First, the number of symptoms a patient experiences does not appear to have an independent effect on treatment management in Wombong. Second, modifications in normal behavior patterns may be confounded with opportunities to administer particular types of remedies and with treatment regimes recommended by medical professionals. The bivariate associations suggest that people are: less likely to wait, more likely to use pills, and more likely to seek assistance from medical professionals. I suspect that caretakers find it easier to administer treatments (particularly simple pills) to patients who can't work or go to school and are confined to bed. In addition, medical professionals often recommend that patients rest and avoid normal activities. In order to assess whether changes in normal behavior patterns affect treatment patterns, a longer list of normal practices needs to be made–another test for further ethnography.

Third, emic evaluations of illness severity appear to affect the use of medical professionals and going outside the compound for assistance. People are over three times more likely to seek professional assistance and over 80% more likely to go outside the compound for "strong" illnesses than for "weak" illnesses. "Weak" illnesses, however, are not associated with any of the other treatments. These data suggest an alternative hypothesis of reversed causality that I had not considered previously: that emic evaluations may arise from people's behavior patterns rather than cause such behavior patterns to occur (Festinger 1957, 1964; Harris 1974; Bernard and Pelto 1987; Bernard 1994).

The research design for collecting these data was based on informant recall. We asked informants after they had treated an illness to tell us what they did and to assess the severity of the illness as "weak" or "strong". We do not know people's assessment of illness severity before they actually treated the illness. I suspect that people who went to the hospital, clinic, or nurse, were more likely to assess an illness as being strong simply as a posthoc justification for seeking such treatments. If we are to answer the question of how does perceptions of severity actually affect behavior, we need to assess perceptions of severity before treatments actually occur (McKinlay 1972; Bernard et al. 1984, 1986).

Finally, duration of illness may not be a good measure of severity at all. Illness duration in part depends on the treatments administered. Illnesses that are not treated are likely to last longer than those that are treated. Both the bivariate associations and the multivariate models suggest that wating is positively related to illness duration. Illness duration also represents the amount of opportunity that caretakers have as they try different treatment modalities. The data on behavioral sequences suggests that the longer an illness lasts, the more likely people are to go outside the compound. If this does not occur, it may be because people see the longer lasting illness as more serious, or because they have tried all the treatments they can within the compound and are seeking some other alternative. Parsing this is yet another task for ethnography.

To What Extent Do Characteristics of the Patient Help Us Predict Treatment Behaviors?

To examine the effects that patient characteristics might have on treatment selection, we recorded the patient's sex and age. In the 433 illness cases, 37.8% of the

patients were male and 62.2% were female. Figure 7–2 shows the stem and leaf plot of patients' ages, and Figure 7–3 shows the quartile distribution of these ages. Given these distributions, I created two dichotomous variables associated with age. The first, AGECHILD is based on whether the patient was a child under the age of ten. Under this definition, 35.0% of the patients were children. The second, AGEOLD is based on whether people were older than 35. By this criterion, 32.8% of the sample were old.

Table 7–11 shows the bivariate associations of the characteristics of patient and treatment behaviors. Waiting and use of professional medical services are not associated directly with the patient's age or sex. Children under 10 years, however, are more likely to be given home remedies than are patients who are older. Patients over 35 are more likely to be taken to healers or be attended to outside the compound than younger people. There is a slight tendency ($p<0.1$) for males to be given pharmaceuticals, but this tendency disappears in the logistic regression models.

Table 7–12 shows the logistic regression models for determinants associated with patient characteristics. On average, patients under 10 are 76% more likely to be given home remedies than are older patients. Patients over 35 are at least 43% more likely to be taken to a healer and are at least 24% more likely to seek outside care than younger patients. The logistic regression models suggest that a patient's gender does not significantly predict any of the six behaviors. In addition, none of the other characteristics of patients predict whether people delay, take pharmaceuticals, or seek professional assistance.

The effects of patients' age on treatment selection is probably due to characteristics of illnesses associated with particular age groups. Children are more likely to be given home remedies because children are more likely to be diagnosed with cough or skin illnesses. Patients over 35 years are more likely to be taken to healers because these patients are also more likely to be diagnosed with illnesses uncommon illnesses.

How Do Characteristics of the Caretaker Help Us Predict Treatment Behaviors?

To determine the effect that characteristics of the caretaker had on treatment behaviors, we collected data on: the sociodemographics of each caregiver, measures of their social networks, and measures of their knowledge and experience with illnesses and treatments.

Sociodemographic information included gender, level of education, age, and the number of children. Figure 7–4, 7–5, 7–6 shows the respective stem and leaf plots for education, age, and number of children. To simplify the analysis, these variables are dichotomized into people who had some education (LITERATE), people who where older than 35 years (CAGEOLD), and people with more than four children (CCHILD). Of the 433 illness episodes, 52% were handled by caretakers who where literate, 55% were over 35, 53% had more than four children, and 57% were women.

We used a survey to collect data on the size, and composition of caretakers' social networks. In the network survey (described in Chapter 3), we showed informants pictures of 214 people from the village and asked informants to tell us, whom they knew, to whom they were related, and what kind of conversations they had with each person (di

they only hare greetings or did they talk about personal matters?). I counted the total number of people an informant indicated knowing among the 214 pictures (PALL). Ties were coded as weak (PWEAK) if an informant indicated that he or she only shared greetings with another person. ties were coded as strong (PSTRONG) if an informant indicated the he or she shared information about personal matters. I created similar variables (KALL, KWEAK, KSTRONG) for people whom informants indicated as being kin.

I also examined each informant's personal social network and calculated measures of network composition. I calculated the average tie strength for each informant (AVTIE), as well as the percentage of men (MALE%), women (WOMEN%), and healers (HEAL%) each person identified from the 214 pictures. I measured the average age (AVAGE), education (AVEDUC), and number of children (AVCHILD) among each informant's network members.

As an indicator of network structure, I measured the density (DENSITY) of each informant's network by first identifying all the people whom an informant knew. I then calculated the average tie strength among all these network members. Large numbers indicated that an informant's network is tightly interwoven. Low numbers, indicated that a person's network is more loosely connected.

By treating all 214 pictures as a random sample of village members, I also calculated each informant's relative position in the village social network. I used the degree measure of centrality (Freeman, L. C. 1979). Degree is the number of contacts (where contacts requires that both individuals recognize each other) an individual has in a

network divided by the total number of members in the entire network. The higher the degree, the more central people are in the network. The lower the degree, the more peripheral people are to other group members. I calculated a centrality measure based on all people each informant knew (PDEG) and based on the kinship ties people had (KDEG).

Table 7–13 shows the intercorrelations among the network variables. I dropped the following variables: KSTRONG and KDEG because they were highly correlated (>0.80) with KALL; AVCHILD because it was highly correlated with AVAGE; and MALE% and FEM% because they were highly correlated with PALL.

I used three surveys to collect data on laypeople's past experience with illnesses and their general knowledge about home remedies and local healers. From the illness behavior survey, I counted the number of times in the five-month period that an informant reported acting as a primary caretaker (BEHCARE). I also labelled a respondent a healer if he or she was identified as such by local community members (HEALER).

From the survey of lay knowledge of home remedies and local healers, I counted the number of illnesses for which each informant knew a healer (ILLHEAL), the number of unique healers known (UNHEAL), the number of popular healers known (where popular meant that more than 20 people mentioned the healer) (POPHEAL), the number of generalist healers (where generalist meant the healer knew how to cure more than 16 illnesses) (GENHEAL), the number of illnesses each informant knew how to cure themselves (ILLSELF), and the number of popular illnesses informants could cure

(where popular referred to the 16 most curable illnesses) (POPSELF). From the treatment preference survey, I counted the number of times that pharmaceuticals (PRPHARM), healers (PRHEAL), clinic (PRCLINIC), and hospital (PRHOSP) were chosen as first treatment for 21 illnesses. I also calculated whether informants had a favorite treatment (they preferred a particular treatment for over half the 21 illnesses) (FAVOR). Table 7–14 shows the intercorrelations among these knowledge variables. I dropped ILLSELF from the analysis as it was highly correlated with POPSELF.

Table 7–15 shows the bivariate relationships between characteristics of caretakers and their treatment behaviors. Sociodemographic characteristics suggest that women are more likely to give home remedies than are men. Caretakers who have more than 4 children are less likely to wait 24 hours before reacting to an illness and are more likely to administer pills. Literate people are more likely to use professional services, while older people are less likely to take advantage the hospital, clinic or local nurse.

The size, composition and density of peoples' social networks all affect people's treatment behaviors. Caretakers who identified more kin in the village are less likely to wait 24 hours before administering some sort of treatment. People with more strong ties are more likely to use home remedies and less likely to seek healers or go outside the compound. On the other hand, people with more weak ties have a slightly higher tendency to use pills or seek healers than are people with few weak ties.

Network composition did little to predict waiting, pills, the use of healers, or going outside the compound. However, people whose networks were composed of more educated members or whose members reported having more intimate ties were more

likely to use home remedies. In contrast, people who had younger networks were less likely to use home remedies. The average education level of network members also played a significant role in determining whether people sought professional assistance. People with more educated networks tended to use the clinic, hospital and local nurse more. Weller et al. (1995) also found that education drives the use of doctors and clinics. The density of a person's networks also predicted the use of professional services and assistance outside the compound. The more tightly interwoven a person's network the more likely they were to go outside the compound, particularly to hospitals or clinics.

Networks appear to play two roles in their effect on treatment choices. First, networks act as conduits of information. The information available to a caretaker depends on the number and strength of network ties. For example, people who identify more network members (PALL) know more healers ($r = 0.20$, $p<0.05$) and claim to know more illnesses that local healers can cure ($r = 0.25$, $p<0.01$). In contrast, people who have more strong ties (PSTRONG) tend to know fewer healers ($r = -0.18$, $p<0.1$) but know more home remedies ($r = 0.37$, $p<0.01$). Many strong ties create self-contained subcultures whose members share knowledge (Granovetter 1973; Boster 1986; Romney et al. 1986). The size of a person's kin network correlates strongly with the number of illnesses a person claims to cure ($r = 0.34$, $p<0.01$). These indirect relationships appear to have behavioral results, namely, people with more strong ties tend to use more home remedies and to use fewer healers. People who have small networks tend to use medical professionals more often, probably because they know fewer healers.

The second effect that networks have on behavior comes from social pressure. People with denser and stronger network ties are likely to experience more social pressure to conform to group norms. I suspect that caretakers with more local kin are under pressure to react quickly to illnesses that affect the kin group. I also suspect that caretakers who have tightly knit networks are under pressure from other network members to use the professional medical services, especially if the network members are highly educated.

People's knowledge of home remedies and of local healers were also significantly related to treatment patterns. People who knew home remedies for more popular illnesses were more likely to administer these treatments and were less likely to go outside the compound to either a local healer or to professional practitioners. In contrast, people who knew more illnesses that were curable by local healers were more likely to delay 24 hours and less likely to use professional medical practitioners. The more healers a person identified, the less likely they were to use pharmaceuticals. The more popular healers they identified (the one identified by many people), the less likely they were to use home remedies.

On the other hand, Table 7–15 demonstrates that people's preferences for certain treatments do not always predict their behavior as expected. The more people indicated they would prefer to use the clinic as a first resort, the less likely they were to use pharmaceuticals and the more likely they were to go to a local healer. Preference for clinic did not predict the use of the clinic or any other medical services at all. Similarly, the more people indicated they would prefer to use country medicine, the less likely they

were to use home remedies. The more people indicated they would select pharmaceuticals as their first choice, the more likely they were to report using home remedies. Preferences for pharmaceuticals failed to predict pharmaceutical use. The only time that preference for a particular treatment actually predicted that treatment's reported use was in the case of going to the hospital. People who indicated they would go to the hospital as their first choice, were more likely to report using the hospital, than were those who didn't indicate hospital as a first choice. These findings require futher ethnographic exploration. I cannot tell, for example, if the discrepancies are caused by reporting inaccuracies, or by adherence to a cultural norm in reporting (as opposed to acting).

Table 7–16 shows the simplified logistic regression models using only characteristics of the caretakers. Many of the weaker bivariate relationships found in Table 7–15 and some of the stronger relationships dissapear. The simple logistic regression model suggests that people are less likely to delay treatment if they have more than 4 children or if they know a lot of kin in the village. People are more likely to delay if they report knowing more illnesses that are cured by a local healer.

The logistic regression model suggests that the use of home remedies is affected by socio-demographic, network, and knowledge determinants. Women on average are 44% more likely to administer home remedies than are men–this despite the fact that men report knowing more home remedies than do women. People with higher average tie strength are also more likely to use of home remedies. Finally, caretakers with more experience handling illnesses, are more likely to use home remedies. On average, for

each additional illness episode a caretaker reported having managed, there was an 8% increase in the likelihood that the caretaker would use a home remedy. In other words, more experienced caretakers who have managed a lot of illnesses are more likely to use home remdies than are novice caretakers who have managed only a few illnesses.

The use of pills is best predicted by the number of children the caretaker has. Caretaker with over four children are approximately twice as likely to use pharmaceuticals as are caretakers with fewer than fvie children. None of the other characteristics of the caretaker are significant in predicting pharmaceutical use.

The logistic regression model suggests that the use of healers is best predicted by the number of popular illnesses that a person reported curing (POPSELF). The more popular illnesses a caretakers reports curing (POPSELF), the less likely the caretaker will seek assistance from a healer. POPSELF also seems to incorporate some of the network effects found in the bivariate associations. In Table 7–15, strong ties (PSTRONG) were inversely related to healer use. In Wombong, the more people you know well, the more likely you are to know home remedies for popular illnesses ($r = 0.372$, $p<0.001$). I suspect that strong ties have multiple effects on treatment preferences. Knowledge of home remedies is passed through strong ties. The more home remedies you know, the less likely you are to need the assistance of a local healer. At the same time, the more strong ties you have, the less weak ties you have. Since knowledge of healers is passed through weak ties, strong ties should be negatively correlated with the use of healers.

According to the logistic regression models, the use of medical professionals is best predicted by preference for hospitals and by two network variables. People with

more educated network members, and people with more dense networks are more likely to seek professional assistance. Although literacy is positively associated with professional services in Table 7–15, this association is predicted by the average education level of all network members. The average education level of network members of literate people is higher than for network members of illiterate people (pooled variance t-test = -12.2, $p<0.001$).

The force of social conformity for use of professionals is also indicated by the positive association between network density and use of professionals, possibly because people who have dense networks may know fewer people. The correlation between density (DENSITY) and total number of people known (PALL) is $r = -0.79$. Density, however, is a stronger predictor than PALL. Density affects the use of medical prefessionals for two reasons. First, in Wombong, density is inversly related to the total number of people an informant knows. In other words, people with dense networks report knowing fewer people in the photo recognition task. Consequently, their access to information about healers is reduced, thus forcing them to seek assistance outside the compound from the more commonly known hopital and clinic. Second, people whose network members are intricately interwoven are more likely to assert more social pressure on each other and therefore do the same thing–to seek help from professionals rather than from healers.

Predicting whether people stay inside or go outside the compound for assistance is best done by knowing the number of popular illnesses a caretaker cures. The more

illnesses they cure, the less likely they are to seek assistance of any kind outside the compound.

How Do Characteristics of the Compound Help Us Predict Treatment Behaviors?

To examine the effects of compound characteristics on treatment behaviors, we collected data on the number of healers (CHEALS), adult males (TAM), adult females (TAF), and children (TC) in each of the 88 compounds. We also identified the quarter in which the compound was located (QUARTER), and created two scales of compound wealth (EYEBALL and ECOPOS).

The demographics survey of the study compounds showed that: only 14% of the compounds had at least one healer in residence; adult males ranged from 0 to 4 with a mean of 1.6; adult females ranged from 0 to 9 with a mean of 2.3; and children ranged from 0 to 8 with a mean of 3.2. Practices of polygomy, as well as migration of males seeking employment outside village, account for the discrepencies between the numbers of males and females in the compounds.

Since the clinic and hospital lie on opposite sides of the village, I measured each compound's location by quarter such that Quarter 1 lies closest to the hospital and Quarter 8 lies closest to the clinic. The quarter variable is thus an ordinal measure of distance from the hospital and clinic.

I derived one of the economic scales from two local informants' evaluations of compound wealth. I asked two research assistants (Mr. George Mbeh and Ms. Christina Muso) to independently rate each compound's wealth on a scale from one to ten. I then

averaged their ratings to create a single wealth variable (EYEBALL). The scale is roughly normally distributed and ranges from 3.5 to 8 with a mean of 4.9. I derived a second economic measure from a list of material possessions found in each compound (ECOPOS). Guttman scaling produced a list of 10 items that formed a unidimensional scale. The material possession scale thus ranges from 0 to 10. It has a mean of 3.5 and a median of 3. The scale is slightly skewed to the right.

Table 7–17 shows the intercorrelations among the compound characteristics. The correlations for the two socio-economic scales is $r = 0.58$. These two scales, however, appear to have different effects on the dependent variables so I have left both of them in the analysis.

Table 7–18 shows the bivariate associations between the independent and dependent variables. The number of healers in a compound appears to affect whether or not people use home remedies. The more adult females in a compound, the less likely are compound members to seek outside assistance. On the other hand, the more adult males in the compound, the less likely will compound members use traditional healers. The more children found in a compound, the more likely people are to use pills.

Both economic scales indicated that increases in compound wealth results in less delay of medical treatments. The EYEBALL scale suggests that people with more wealth are more likely to use pills. The ECOPOS Guttman scale suggests that the more possessions people have, the more likely they are to seek assistance outside the compound, particularly from professionals. Distance to the hospital and clinic (as measured by quarter location) appear to have no effect on whether or not people use

these facilities. This is probably due to the fact that the distances are under 3 kilometers (a 45 minute walk at most).

Table 7–19 shows the results of logistic regressions for determinants associated with compound characteristics. Waiting and pills are best predicted by key informants' estimation of compound wealth. Compounds with higher wealth are less likely to wait 24 hours and are more likely to administer pills than compounds with lower levels of wealth. The use of home remedies is best predicted by the number of healers in the compound. Compounds that have at least one healer are almost twice as likely to use a home remedy than are compounds that do not have a healer.

For treatments outside the compound, logistic regressions show that each additional adult female reduces the likelihood of seeking outside assistance by roughly 15%. This effect is independent of the economic wealth of a compound, which shows that as wealth increases so does the likelihood of seeking either traditional or professional practitioners. The use of healers, however, is best predicted by the number of adult males in a compound. Each additional male reduces the likelihood of seeking a healer by roughly 38%. The use of medical professionals, is best predicted by the economic possessions of the compound. The more items people have, the more likely they are to use professional services.

Having looked at the effects of the different classes of determinants on treatment behaviors, I now examine how variables in different classes interact.

To What Extend Do Combinations of Variables in Different Determinants Classes Help Us Predict Treatment Behaviors?

To answer this question, I systematically combined the four simplified models for each dependent variable. I first combined illness and patient characteristics using progressively more stringent criteria during three iterations of logistic regression. I repeated this process with characteristics of, first the caretaker and then the compound. Table 7–20 shows the final composite models for each of the six treatment behaviors.

Waiting 24 hours before administering other treatments is best predicted by signs of vomiting, illnesses diagnosed as accidents, illnesses that result in missed work and school and that require bed rest, the size of people's kinship network, and compound wealth as measured by informants' emic estimations. Caretakers are at least 20% more likely to do something in the first 24 hours if they see signs of vomiting than if they don't. People are at least 72% more likely to react quickly to an accident than to any other kind of illness diagnosis. Patients whose normal behavior is interupted are more likely to receive care immediately than are those whose normal behavior is not interupted. People with larger kin networks are less likely to wait than are people with small kin networks. And in compounds with more wealth, people are less likely to delay.

Home remedies are best predicted by whether or not the illness is diagnosed as fever, the gender of the caretaker, and the number of identified healers in a compound. If the illness is diagnosed as a fever, people are on average 56% less likely to use a home remedy than if they were diagnosed with any other illness. (On the other hand, illnesses that show signs of fever are almost twice as likely to be treated with pills.) Female

caretakers are 43% more likely to use home remedies than are their male counterparts. This occurs despite the fact that men report knowing how to cure more illnesses with home remedies than women report knowing. Finally, people are more likely to administer home remedies if there are healers in the compound. Interestingly, people's reports of knowing home remedies failed to predict the use of home remedies.

The use of pills is highly dependent on particular characteristics of an illness. An illness that exhibits signs of fever is almost twice as likely to be treated with a pharmaceutical than is an illness that doesn't exhibit signs of fever. In contrast, illnesses diagnosed as cough, stomach ache or "other" are all less likely to be treated with pharmaceuticals. Illnesses perceived as having come from some aspect of the natural climate are 188% more likely to be treated with pills. People with five or more children are also twice as likely to treat their patients with pills than are those people who have fewer than five children.

The key determinants associated with whether people seek assistance outside the compound is related to signs of headache, the knowledge of home remedies, and economic wealth. Illnesses that demonstrate signs of headache are over half as likely to be taken outside the compound. In addition, the more common illnesses a caretaker reports knowing how to cure, the more likely he or she is not to seek outside assistance. Finally, the more material possessions a compound has, the more likely caretakers will go outside the compound for help.

The use of local healers is best predicted by illness diagnosis, the knowledge of home remedies and the number of adult males in a compound. Illnesses that are

diagnosed as something other than accident, fever, cough, or stomach ache are over 13 times more likely to be taken to a healer than are more commonly diagnosed illnesses. In addition, the more illnesses a caretaker reports being able to cure the less likely he or she is to use a traditional healer. And finally, the more adult males in a compound, the less likely a patient will be taken to a healer.

The use of professional practitioners can be predicted from caretaker's assessment of illness severity, as well as from the density of caretaker's networks and the wealth of the compound. Caretakers who asses an illness as having been "strong" are over two and a half times more likely to use professional services than are caretakers who asses an illness as "weak". In addition, the denser an informant's network or the more material possessions found in a compound, the more likely they will be to seek professional assistance.

Conclusions

What do the six composite models in Table 7–20 tell us about how different types of determinants affect home case management? First the data suggest that many factors affect what people do in home case management, but no single variable nor class of determinants plays a dominant role in explaining all types of treatment behaviors. In fact, of the 20 variables in the final six composite models, 16 (80%) help us predict only a single treatment modality. This is not to say that there are no overall patterns in the data, but only that the quest to show that one group of variables is more predictive than another is misguided. Instead of asking, "Which variables are dominant in explaining behavior?",

a more productive approach would be to ask, "What role do different types of variables play in understanding home case management?"

In Wombong, caretaker's recognition of signs and symptoms, illnesses diagnosis, and attributions of causality help us predict what people do in the home. With a few exceptions, these characteristics of illnesses offer little assistance in predicting when people seek care outside the home, particularly from traditional healers or medical professionals. Among sign recognition, illness diagnosis, and causal attribution, the last is the least predictive of treatment behaviors. This is in stark contrast to much of the anthropological literature which suggests that attributions of causality are a key force in determining what people do. See Kroeger (1983a) for extensive review.

Not all signs, diagnosis, or perceptions of causality, however, are tied to behavioral outcomes. Although we began by examining fourteen signs, seven illness diagnoses, and nine types of causes, I found that only three signs, five illness terms, and one causal attribution contributed to the composite models. Some of the variables were eliminated because they were highly correlated with others. For the most part, however, variables were dropped simply because they are not associated with any treatment behavior. In the process of managing illnesses, caretakers recognize a lot of signs, they diagnose the illnesses as being a particular type of problem, and they usually attribute the illness to a particular cause. The data from Wombong, however, strongly suggest that caretakers don't act directly on all this information. In fact, the majority of the information is not predictive of behavior at all.

When signs, diagnosis, and causality do influence treatment patterns, they have both positive and negative effects. For example, recognizing signs of fever increases the likelihood of using a pill while recognizing signs of headache decreases the likelihood that people seek care outside the compound. Diagnosing an illness as cough increases the likelihood of using home remedies and decreases the likelihood of using a pharmaceutical. Intuitively, I think we assume that people recognize signs, diagnosis illnesses, and attribute causality to help them decide what to do. The data suggest, however, that sign recognition, illness diagnosis, and causal attributions are equally likely to help people decide what not to do.

Of the original four measures of illness severity, only two were found to be important in the final models. People who are confined to bed and can't go to work or school are more likely to not delay some sort of treatment. Caretakers who assess an illness as being "strong" are over two and half times more likely to seek treatment from medical professionals. In addition to the severity of the illness, I suspect that the lack of delay comes partially as the result of increased opportunities to administer treatments to patients confined to bed or the compound. I also caution against making too much of the association between emic assessments of severity and the use of medical professionals. I suspect that a flaw in the research design compromised the emic measure of severity. Since we asked informants to access illness severity after they had already treated the illness, some informants probably used the treatment, rather than signs and symptoms, to evaluate the strength of the illness. We should not be surprised that caretakers who took a patient to a medical professional provide a posthoc evaluation of the illness as being

"strong". A more detailed research design is needed to accurately assess the effect of caretakers' evaluations of illness severity.

Characteristics of the patient have no overall effect on treatment behaviors. Although Table 7–12 shows that children under the age of 10 are more likely to be given home remedies, it turns out that this association is the result of children being more susceptible to cough, which is typically treated with home remedies. Table 7–12 also shows that adults over the age of 35 years were more likely to be taken to healers. This effect also disappears when both the diagnosis of the illness and the number of home remedies a caretaker knows are added to the model.

Although Table 7–15 shows that there is a positive association between literacy and use of medical professionals, Table 7–16 shows that this association is masked by the average education level of a caretaker's network members. In other words, the average education level of network members is a better predictor of professional services than whether the caretaker is literate or not. Table 7–20, however, shows that both of these associations are masked by wealth of a compound. Mebers of wealthier compounds know more educated people. Compound wealth (as measured by number of possession) incorporates both wealth and education and therefore is a better predictor of whether or not people use the hospital, clinic, or local nurse.

Social networks also play a direct and indirect role in treatment behaviors. Table 7–20 shows that increases in the size of local kin networks reduces the likelihood that people will delay treatments. Increases in the density of a caretaker's network also increases the probability that caretakers will seek assistance from professional

practitioners. Table 7–15 shows that increases in overall network size decreases the likelihood that people will use medical services, while increases in a caretakers' strong ties, decreases the likelihood that the caretaker will use a healer. This evidence supports the notion that the larger the size of the network (particularly the weak ties), the more likely people are to know of a healer and seek their assistance. The stronger a person's ties with other network members, the less likely they are to acquire information about healers and the more likely they are to have to resort to more commonly recognized treatment alternatives such as the hospital, clinic, or local nurse. These indirect relationships are incorporated in the measure of network density.

Table 7–16 suggests that various aspects of a caretaker's knowledge of home remedies and healers, as well as a caretaker's preferences for particular treatments, play key roles in predicting treatment behavior. In the composite models, however, only the number of popular illnesses a caretaker claims to cure is predictive of behavior. The more popular illnesses a caretaker claims to cure, the less likely they are to use a healer or go outside the compound. Knowledge of home remedies does not, however, predict whether caretakers actually administer home remedies. This is not surprising given that men, who claim to know more home remedies in general, are significantly less likely to administer home remedies to patients. What people say they know, is not necessarily what they do. The composite models of these data suggest that external variables are better predictors of behavior than internal variables associated with a caretaker's knowledge of home remedies and local healers and preferences for particular kinds of treatments.

Compound characteristics affect treatments inside and outside the compound. The more healers in the compound, the more likely caretakers (who are not actually healers themselves) will use home remedies. This appears to be an effect of group knowledge rather than of individual knowledge. For reasons I do not fully understand, the more adult males in a compound, the less likely compound members are to use traditional healers.

Economic wealth plays a significant role in determining behavior on two levels. The more wealth a compound has (as measured by key informants' estimations of wealth) the less likely they are to delay treatments. In addition, the more possessions a compound has, the more likely they will seek assistance outside the compound, particularly from medical professionals. Compound wealth, regardless of how it is measured, has no effect on whether caretakers use traditional healers. The hypothesis that poorer members of society use healers is not support by these data. But the hypothesis that more educated (and presumably wealthier) members of society use clinics is supported.

The earlier observation that characteristics of illnesses are better predictors of home-based treatments is further complimented by the observation that treatments administered outside the home are better predicted by external variables associated with characteristics of the caretaker and compound. Plausible mechanisms for explaining these determinants can be drawn using a decision-making framework outlined in Appendix C. In such a framework, people experience illnesses in a series of stages. They first recognize signs and symptoms of an illness. They then diagnose the illnesses as a particular kind of problem. They then consider a set of alternatives and select among them. After choosing a treatment they observe the patient's reaction. Given this

framework, we should expect characteristics that play key roles early in the decision making process (such as recognition of signs, diagnosis of illness, and attributions of causality) to be associated with treatments that caretakers usually try first, namely delay of treatment and treatments administered inside the compound. As the illness progresses, more complicated internally processing such as evaluations of illness severity will play a role.

Characteristics of patients, caretakers, and compounds affect decisions all along the process. Many of these characteristics are proxies for access to resources, particularly resources pertaining to information and wealth. For example, increases in strong network ties reduces the potential for knowing of a healer who could cure a particular illness, This reduces the chance of a caretaker considering and therefore selecting a healer. Wealth plays a similar role. People who have access to the wealth required to use professional services, are more likely to consider and therefore potentially select these services.

Figure 7–1 Stem and leaf plot of duration of illness episodes (LAST) (N=433).

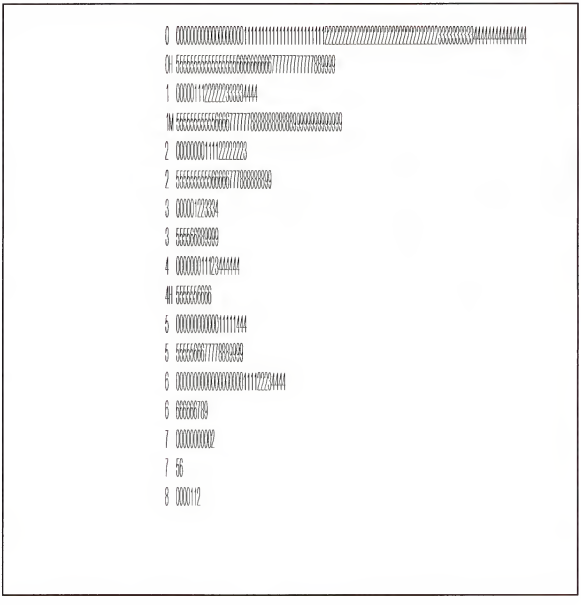


Figure 7–2 Stem and leaf plot of patients' age (n=412).

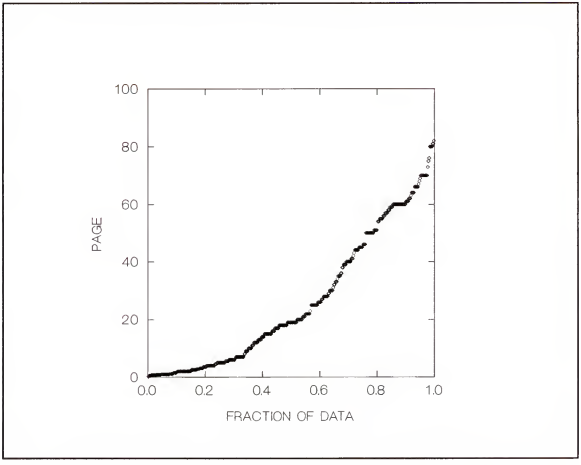


Figure 7–3 Quartile plot of patients' ages (PAGE) for 412 illness episodes.

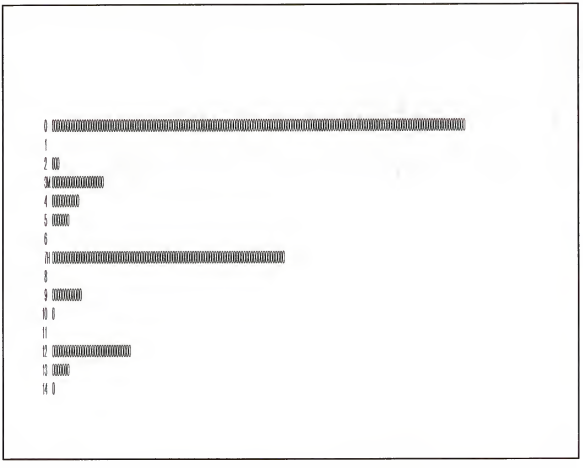


Figure 7–4 Stem and leaf plot of caretakers' education (n=359).

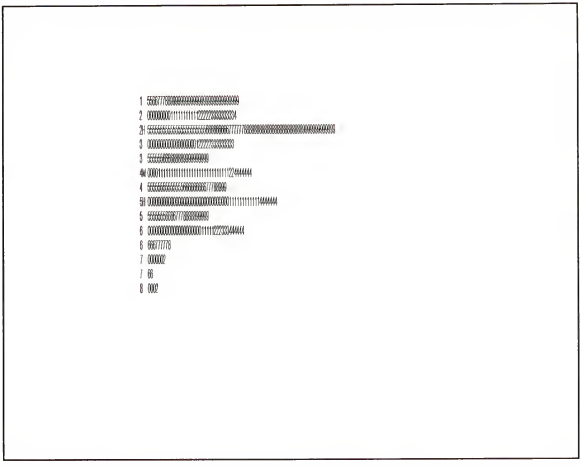


Figure 7–5 Stem and leaf plot of caretakers' age (n=410).

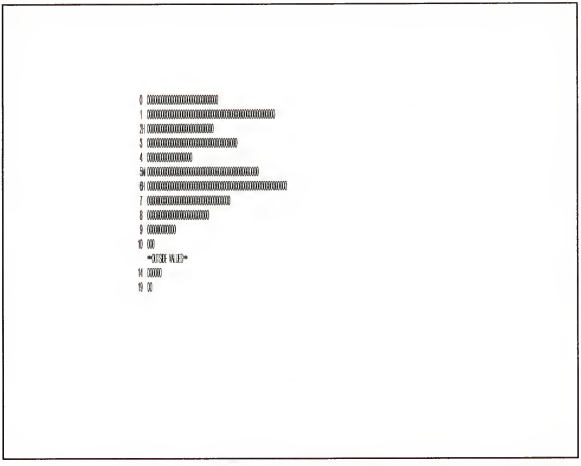


Figure 7–6 Stem and leaf plot of number of caretaker' children (n=359).

Table 7–1 Univariate statistics for binary dependent variables (N=433).

Dependent Variable	Mean	Standard Deviation
Waiting	0.60	0.49
Home Remedy	0.47	0.50
Pharmaceutical	0.55	0.50
Healer	0.13	0.34
Medical Professional	0.09	0.29
Sequence Type	0.21	0.41

Table 7–2 Pearson correlation matrix of symptoms.

	Fever	Headache	Chills	Sweating	Joint ache	Cough	Runny nose	Diarrhea	Stomache	Vomit	Sadness	Dry lips	Pain
Headache	0.437*												
Chills	0.549*	0.397*											
Sweating	0.374*	0.281*	0.421*										
Joint ache	0.341*	0.378*	0.331*	0.284*									
Cough	0.058	0.06	0.084	0.075	0.078								
Runny nose	0.06	0.035	0.018	0.079	0.049	0.580*							
Diarrhea	0.025	0.04	0.002	0.111	0.037	0.014	0.023						
Stomache	0.01	0.086	0.035	0.071	0.012	0.001	0.001	0.322*					
Vomiting	0.102	0.01	0.033	0.157	0.008	0.055	0.088	0.275*	0.121				
Sadness	0.149	0.156	0.174	0.127	0.136	0.118	0.116	0.036	0.086	0.023			
Dry lips	0.219*	0.247*	0.249*	0.208*	0.212*	0.04	0.013	0.001	0.006	0.047	0.338*		
Pain	0.037	0.111	0.082	0.09	0.266*	0.178	0.039	0.002	0.05	0.048	0.022	0.04	
Itching	0.032	0.02	0.033	0.056	0.018	0.108	0.084	0.014	0.003	0.015	0.035	0.024	0.117

* Bonferroni probabilities < 0.001

Table 7–3 Factor analysis of symptom variables.

Symptom	FACTOR LOADING				
	1	2	3	4	5
Fever	0.704	0.035	-0.015	-0.272	-0.077
Chills	0.697	-0.016	0.021	-0.181	-0.051
Headache	0.59	-0.015	0.079	-0.023	0.034
Sweating	0.544	-0.04	-0.137	-0.066	0.082
Joint ache	0.541	0.144	0.128	0.066	0.202
Cough	0.077	-0.786	-0.041	-0.093	0.027
Runny nose	0.025	-0.748	0.009	0.116	0.208
Diarrhea	0.053	0.063	-0.744	0.122	0.094
Pain	0.185	0.23	0.154	0.223	0.483
Dry lips	0.442	0.017	0.079	0.391	-0.298
Sadness	0.32	-0.147	-0.018	0.363	-0.18
Itching	0.028	0.134	0.009	0.057	0.104
Vomiting	0.076	0.101	-0.379	-0.124	0.013
Stomache	0.083	0.005	-0.39	0.093	-0.002
Variance explained by factors:	2.273	1.306	0.923	0.515	0.476
% of total variance explained:	16.236	9.332	6.596	3.677	3.399

Table 7–4 Univariate statistics for categorical variable DIAG (N=433).

Category	Frequency	Percentage
Cough/Cold	117	27.02
Fever	113	26.10
Headache	87	20.09
Stomach ache	37	8.55
Skin illnesses	14	3.23
Accident	18	4.16
Other	47	10.85
	433	100.00

Table 7–5 Percentage of reported symptoms by illness diagnosis (DIAG) (N=433).

	Diagnosed Illnesses								
Signs/ Symptoms	Cough & cold	Fever	Headache	Stomach ache	Skin Illness	Accident	Other	Freq.	% Total Episodes
Sadness	27.16	27.41	20.81	8.38	2.54	3.81	9.90	394	90.99
Fever	16.78	38.81	25.52	5.59	2.10	2.45	8.74	286	66.05
Cough	44.53	24.70	21.46	2.83	1.21	0.81	4.45	247	57.04
Pain	14.40	23.20	18.40	4.00	4.80	12.00	23.20	125	28.87
Diarrhea	16.33	24.49	14.29	32.65	2.04	0.00	10.20	49	11.32
Totals	117	113	87	37	14	18	47	433	
Total %	27.02	26.10	20.09	8.55	3.23	4.16	10.85		

Table 7–6 Univariate statistics for categorical variable CAUSE (N=433).

Category	Frequency	Percentage
Climate	163	37.64
Don't know	116	26.79
Work/Exertion	34	7.85
Other illnesses	33	7.62
Food/Worms	24	5.54
Accidents	16	3.70
Normal sickness	16	3.70
Supernatural	9	2.08
Other	22	5.08
	433	100.00

Table 7–7 Frequency and percentage of attributed causes (CAUSE) by illness diagnosis (DIAG) (N=433).

	Diagnosed Illnesses (frequencies)								
Attributed Causes	Cough	Fever	Headache	Stomach	Skin	Accident	Other	Total	% of Total
Climate/Season	73	46	39	1	1	0	3	163	37.64
Don't know	26	33	19	14	7	0	17	116	26.79
Work/Exertion	4	9	10	0	0	3	8	34	7.85
Other illnesses	6	7	7	3	2	0	8	33	7.62
Food/Worms	0	4	4	14	0	0	2	24	5.54
Accidents	0	0	0	0	0	15	1	16	3.7
Normal sickness	4	1	3	1	2	0	5	16	3.7
Supernatural	1	3	3	0	1	0	1	9	2.08
Other	3	10	2	4	1	0	2	22	5.08
Totals	117	113	87	37	14	18	47	433	
% of total	27.02	26.10	20.09	8.55	3.23	4.16	10.85		

	Diagnosed Illnesses (pecentage)							
Attributed Causes	Cough	Fever	Headache	Stomach	Skin	Accident	Other	Total
Climate/Season	44.79	28.22	23.93	0.61	0.61	0.00	1.84	100
Don't know	22.41	28.45	16.38	12.07	6.03	0.00	14.66	100
Work/Exertion	11.76	26.47	29.41	0.00	0.00	8.82	23.53	100
Other illnesses	18.18	21.21	21.21	9.09	6.06	0.00	24.24	100
Food/Worms	0.00	16.67	16.67	58.33	0.00	0.00	8.33	100
Accidents	0.00	0.00	0.00	0.00	0.00	93.75	6.25	100
Normal sickness	25.00	6.25	18.75	6.25	12.50	0.00	31.25	100
Supernatural	11.11	33.33	33.33	0.00	11.11	0.00	11.11	100
Other	13.64	45.45	9.09	18.18	4.55	0.00	9.09	100
Totals	27.02	26.10	20.09	8.55	3.23	4.16	10.85	

Table 7–8 Pearson correlation matrix of severity measures.

	LAST	SEVBEH	SEVCNT
Behavior changes (SEVBEH)	-0.03		
# of signs (SEVCNT)	0.05	0.26*	
Emic evaluations (SEVEMIC)	0.08	0.20*	0.16*

*Bonferroni probabilities < 0.01

Table 7–9 Summary table of significant bivariate relationships between treatment selection. and illness characteristics as measured by chi-square or t-tests

	Wait	Home Remedy	Pill	Healer	Medical Profes.	Inside/ Outside
Signs/Symptoms						
Fever		- - -	+++	- -		
Headache	-	- - -	+++		- -	- -
Vomiting	- - -	+				
Pain	- -					
Sadness			+			
Diarrhea						+
Cough						
Illnesses						
Accident	- - -					
Fever		- - -	+++		+	
Headache		-	+++		-	- - -
Skin		+				
Cough	+++	+++	- - -			
Stomach			- -			
Other			- - -	+++		+++
Causation						
Food	-					
Climate			+++			
Work		-		+		
Other Ills			- -	++		
Other			-		++	+
Don't know						
Severity						
SEVCNT5		- -*	+++*			
SEVBEH	- -*		+++*		++*	
SEVEMIC			+		+++	+++
LAST	+++*			+*		++*

*Based on pooled variance t-test, otherwise based on χ^2. Positive associations: + = p<0.1; ++ = p<0.05; +++ = p<0.01. Negative associations: – = p<0.1; – – = p<0.05; – – – = p<0.01. See Table 2–2 for descriptions of coded variables.

Table 7–10 Reduced logistic regression models for treatment behaviors using only characteristics of illnesses.

	Wait			Home Remedy			Pill			Healer			Medical Professional			Inside/ Outside		
	Odds	95%	p	Odds	95%	p	Odds	95%	p	Odds	95%	p	Odds	95%	p	Odds	95%	p
Signs/Symptoms																		
Vomiting	0.47	0.86–0.25	0.02	1.88	3.38–1.05	0.03												
Fever							1.95	3.10–1.22	0.00									
Headache													0.30	0.63–0.14	0.00	0.52	0.87–0.31	0.01
Illnesses																		
Accident	0.09	0.32–0.02	0.00															
Fever				0.56	0.91–0.34	0.02												
Cough				1.86	2.97–1.16	0.01	0.35	0.59–0.20	0.00									
Stomach							0.37	0.80–0.17	0.01									
Other							0.24	0.49–0.11	0.00	4.90	9.67–2.49	0.00						
Skin				3.29	10.90–0.99	0.05												
Causation																		
Climate							1.95	3.14–1.21	0.00									
Other													4.52	14.02–1.46	0.01			
Severity																		
SEVBEH	0.71	0.92–0.55	0.01										1.73	2.77–1.08	0.02			
SEVEMIC													3.29	6.73–1.61	0.00	1.82	3.10–1.07	0.03
LAST	1.08	1.14–1.02	0.01													1.05	1.10–1.00	0.40

Model Statistics	Wait	Home Remedy	Pill	Healer	Medical Professional	Inside/Outside
Constant (Coef.,	0.78, p=0.01	-0.28, p=0.07	0.06, p=0.82	-2.16, p=0.00	-3.32, p=0.00	-1.63, p=0.00
Chi-Square p-	0.00	0.00	0.00	0.00	0.00	0.00
Log Likelihood	36.71	26.60	65.18	18.73	27.76	14.38
Degrees of	4.00	4.00	4.00	1.00	4.00	3.00

See Table 2–2 for description of variable codes.

Table 7–11 Summary table of significant bivariate relationships between treatment selection and patient's age and gender as measured by chi-square tests.

Patient Characteristics	Treatment Behaviors					
	Wait	Home Remedy	Pill	Healer	Medical Professional	Inside/ Outside
Gender †			+			
Ageold ‡				+++		+++
Agechild@		+++				

†Gender: 0=Female, 1=Male. ‡AGEOLD: 0=(<35 years), 1=(>34 years). @AGECHILD: 0=(>9 years).
Positive associations: + = $p<0.1$; ++ = $p<0.05$; +++ = $p<0.01$.

Table 7–12 Reduced logistic regression models for treatment behaviors using only characteristics of patient.

	Wait			Home Remedy			Pill			Healer			Medical Profes.			Inside/ Outside		
	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p
Sex†																		
Age																		
AGEOLD‡										2.53	4.49–1.43	0.00				2.01	3.26–1.24	0.01
AGECHILD@				1.76	2.65–1.17	0.01												

Model Statistics	Wait	Home Remedy	Pill	Healer	Medical Profes.	Inside/Outside
Constant (Coef., p)	–	0.31, p=0.01	–	-2.22, p=0.00	–	-1.56, p=0.00
Chi-Square p-value	–	0.01	–	0.00	–	0.01
Log Likelihood	–	7.47	–	10.06	–	7.89
Deg. of Freedom	–	1	–	1	–	1

†Sex: 0=Female, 1=Males; ‡AGEOLD: 0=(<35 years), 1=(>34 years); @AGECHILD: 0=(>9 years), 1=(<10 years).

Table 7–13 Pearson correlations among independent network variables.

	PALL	PSTRONG	PWEAK	KALL	KSTRONG	KWEAK	AVTIE	AVAGE	AVEDUC	AVCHILD	MALE%	FEM%	HEAL%	DAVAV	PDEG
PSTRONG	0.221														
PWEAK	0.629	-0.157													
KALL	0.336	0.350	-0.223												
KSTRONG	0.329	0.181	-0.130	0.897											
KWEAK	0.136	0.491	-0.113	0.389	0.160										
AVTIE	0.086	0.519	-0.705	0.599	0.435	0.343									
AVAGE	-0.149	-0.120	-0.048	0.063	0.211	-0.127	-0.091								
AVEDUC	0.031	0.133	-0.010	-0.095	-0.244	0.140	0.092	-0.779							
AVCHILD	0.001	-0.127	0.030	0.162	0.278	-0.108	-0.073	0.911	-0.762						
MALE%	0.856	0.186	0.544	0.298	0.297	0.165	0.051	0.133	-0.033	0.228					
FEM%	0.964	0.213	0.602	0.316	0.305	0.107	0.072	-0.294	0.071	-0.129	0.688				
HEAL%	0.721	0.140	0.504	0.191	0.228	0.018	-0.032	0.208	-0.242	0.280	0.794	0.601			
DAVAV	-0.787	-0.192	-0.549	-0.303	-0.352	-0.037	0.018	-0.062	0.031	-0.110	-0.687	-0.752	-0.522		
PDEG	0.789	0.423	0.130	0.480	0.392	0.275	0.538	-0.056	0.015	0.063	0.730	0.732	- 0.580	-0.558	
KDEG	0.404	0.167	-0.113	0.830	0.866	0.138	0.481	0.196	-0.247	0.280	0.355	0.380	- 0.273	-0.373	0.565

See Table 2–2 for description of variable codes.

Table 7–14 Pearson correlations among independent general knowledge variables.

	BEHCARE	HEALER	ILLHEAL	UNHEAL	POPHEAL	GENHEAL	ILLSELF	POPSELF	PRHEAL	PRCLINIC	PRHOSP
HEALER	0.047										
ILLHEAL	0.433	-0.097									
UNHEAL	0.135	0.227	0.516								
POPHEAL	-0.196	-0.146	-0.085	0.307							
GENHEAL	0.032	0.102	0.136	0.213	0.008						
ILLSELF	0.323	0.364	0.514	0.459	-0.217	-0.089					
POPSELF	0.271	0.253	0.520	0.443	-0.193	-0.052	0.947				
PRHEAL	-0.048	-0.032	0.127	0.013	-0.119	0.339	-0.037	-0.023			
PRCLINIC	-0.185	-0.024	-0.148	-0.015	0.106	0.008	-0.211	-0.221	-0.241		
PRHOSP	-0.296	-0.123	-0.277	0.019	0.116	-0.069	-0.232	-0.217	-0.091	-0.089	
FAVOR	0.135	-0.007	0.185	0.018	0.077	0.043	0.060	0.040	-0.058	0.148	-0.239

See Table 2–2 for description of variable codes.

Table 7–15 Summary table of significant bivariate relationships between treatment selection and caretaker characteristics as measured by chi-square or t-tests.

	Wait	Home Remedy	Pill	Healer	Medical Profes.	Inside/ Outside
Socio/Demographics						
Sex*		- -				
Children > 4*	- -		+++			
Literate*					++	
Age >35*					- -	-
Social Networks						
Size						
PWEAK			+	+		
PSTRONG	-	++		- - -		- - -
PALL					- - -	
KALL	- - -					
KWEAK	-					
Composition						
AVEDUC		+			++	
AVTIE		++	-	-		-
AVAGE		- -			-	
HEALER%	-	-				
Structure						
DENSITY					+++	++
PDEG						
Knowledge/Experience						
Past Experience						
BEHCARE		+++				
HEALER		++				- -
General knowledge						
POPSELF		++		- - -	- -	- - -
PRPHARM		++				
ILLHEAL	++				- -	
FAVOR	+					
GENHEAL	+			+		
POPHEAL	+	- -				+
PRHEAL		- -				
UNHEAL			- -			
PRCLINIC			- - -	+++		++
PRHOSP					+++	

*Based on χ^2 statistic, otherwise based on pooled variance t-test. Positive associations: + = p<0.1; ++ = p<0.05; +++ = p<0.01. Negative associations: – = p<0.1; – – = p<0.05; – – – = p<0.01. See Table 2–2 for descriptions of coded variables.

Table 7–16 Reduced logistic regression models for treatment behaviors using only characteristics of caretaker.

	Wait			Home Remedy			Pill			Healer			Medical Profes.			Inside/ Outside		
	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p
Socio/demog.																		
Gender				0.56	0.89–0.36	0.02												
Children>4	0.60	1.00–0.36	0.05				2.00	3.11–1.28	0.00									
Social Networks																		
KALL10	0.76	0.94–0.60	0.01															
AVEDUC10													1.14	1.28–1.02	0.03			
AVTIE10				1.30	1.59–1.07	0.01												
DENSI100													1.19	1.32–1.08	0.00			
Knoweledge																		
BEHCARE				1.08	1.14–1.03	0.00												
POPSELF										0.10	0.49–0.02	0.01				0.12	0.47–0.03	0.00
ILLHEAL	1.05	1.09–1.01	0.00															
PRCLINIC							0.92	1.02–0.80	0.09									
PRHOSP													1.30	1.55–1.09	0.00			
Model Statistics	Wait			Home Remedy			Pill			Healer			Medical Profes.			Inside/Outside		
Constant (Coef.,	0.86, p=0.01			-3.95, p=0.01			0.13, p=0.52			-0.99, p=0.00			-29.97, p=0.00			-0.50, p=0.07		
Chi-Square p-	0.01			0.00			0.00			0.02			0.00			0.00		
Log Likelihood	12.00			19.84			16.66			8.60			25.22			10.15		
Deg. of Freedom	3			3			2			1			3			1		

See Table 2–2 for description of variable codes.

Table 7–17 Pearson correlations among independent compound characteristics.

	CHEALS	TAM	TAF	TC	EYEBALL	ECOPOS
TAM	0.226					
TAF	0.577	0.288				
TC	0.028	0.058	0.314			
EYEBALL	-0.261	0.106	-0.129	0.095		
ECOPOS	-0.025	0.111	-0.030	0.099	0.598	
QUARTER	0.211	-0.050	0.278	-0.142	-0.278	-0.006

See Table 2–2 for descriptions of coded variables.

Table 7–18 Summary table of biivariate relationships between treatment selection and compound characteristics as measured by t-tests.

	Wait	Home Remedy	Pill	Healer	Medical Profes.	Inside/ Outside
CHEALS		+++		-		-
Adult	+	+		-		- - -
Adult Males				- - -		-
Children	-		++			
EYEBALL	- - -		++		+	
ECOPOS	- - -				+++	+++
QUARTER						

Positive associations: + = p<0.1; ++ = p<0.05; +++ = p<0.01. Negative associations: – = p<0.1; – – = p<0.05; – – – = p<0.01. See Table 2–2 for descriptions of coded variables.

Table 7–19 Reduced logistic regression models for treatment behaviors using only characteristics of compound.

	Wait			Home Remedy			Pill			Healer			Medical Profes.			Inside/ Outside		
	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p
CHEALS				1.93	2.72–1.37	0.00												
Adult females																0.85	0.97–0.74	0.02
Adult males										0.62	0.89–0.43	0.01						
EYEBALL	0.63	0.78–0.52	0.00				1.24	1.51–1.02	0.03									
ECOCEN													1.29	1.46–1.13	0.00	1.12	1.23–1.02	0.02

Model	Wait	Home Remedy	Pill	Healer	Medical Profes.	Inside/Outside
Constant (Coef.,	2.85, p=0.00	-0.33, p=0.00	-0.87, p=0.10	-1.03, p=0.00	-3.28, p=0.00	-1.16, p=0.00
Chi-Square p-	0.00	0.00	0.03	0.01	0.00	0.00
Log Likelihood	21.10	15.38	4.88	7.15	14.47	12.28
Deg. of Freedom	1	1	1	1	1	2

See Table 2–2 for description of variable codes.

Table 7–20 Reduced logistic regression models for treatment behaviors using characteristics of illnesses, caretakers, and compounds.

	Wait			Home Remedy			Pill			Healer			Medical Profes.			Inside/ Outside		
	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p	Odds Ratio	95% Confidence interval	p
Illnesses																		
Sign-Vomiting	0.40	0.80–0.200	0.01															
Sign-Fever							1.98	3.31–1.18	0.01									
Sign-Headache																0.47	0.89–0.25	0.02
Ill-Accident	0.03	0.28–0.00	0.00															
Ill-Fever				0.53	0.88–0.33	0.01												
Ill-Cough				1.71	2.75–1.06	0.03	0.44	0.79–0.24	0.01									
Ill-Stomach							0.44	1.02–0.19	0.05									
Ill-Other							0.30	0.67–0.14	0.00	13.63	40.00–4.64	0.00						
Cause-Climate							1.88	3.17–1.11	0.02									
SEVBEH	0.68	0.92–0.51	0.01															
SEVEMIC													2.67	7.06–1.01	0.05			
Caretakers																		
Soc/dem-Gender				0.59	0.88–0.39	0.01												
Soc/dem-Child>4							2.03	3.21–1.29	0.00									
Nets-KALL10	0.81	1.01–0.65	0.06															
Nets-DENSI100													1.25	1.40–1.11	0.00			
Know-POPSELF										0.03	0.27–0.00	0.00				0.15	0.65–0.03	0.01
Compounds																		
Healers				2.08	2.97–1.46	0.00												
Adult males										0.65	1.01–0.41	0.05						
EYEBALL	0.69	0.88–0.55	0.00															
ECOPOS													1.45	1.75–1.19	0.00	1.14	1.29–1.02	0.02

Table 7–20 -- Continued.

	Wait	Home Remedy	Pill	Healer	Medical Profes.	Inside/ Outside
Constant (Coef., p)	3.78, p=0.00	-0.12, p=0.52	-0.49, p=0.12	-0.27, p=0.56	-31.78, p=0.00	-0.66, p=0.11
Chi-Square p-value	0.00	0.00	0.00	0.00	0.00	0.00
Log Likelihood	42.01	40.25	55.42	35.05	23.46	19.15
Degrees of Freedom	5	4	6	3	3	3

See Table 2–2 for description of variable codes.

APPENDIX A
SURVEY AND INTERVIEW SCHEDULES

Interview # _____ Ecode (Ind) _____
Interviewer _____ Ccode (Comp) _____
Date _____ Picture # _____

_____ kae ku và lvɨyn, a wa mosɨ sɨ chu' tyae? A wa li fu asɨ afɨ ma, a wa ndu sɨ wul afɨ ila' ma, a wa ndu a health centre ma, a wa ndu a hospital ma, "or" Pa Njingo?

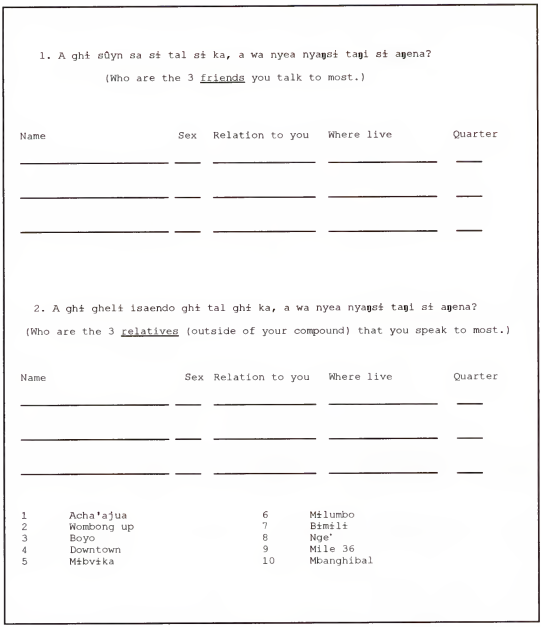
	asɨ afɨ	afɨ ila'	clinic	hospital	Pa Jingo
agvɨl ato	_____	_____	_____	_____	_____
ɨlva ko'nɨ	_____	_____	_____	_____	_____
ɨchfɨ ɨ fɨdwo'	_____	_____	_____	_____	_____
atu a chwotɨna	_____	_____	_____	_____	_____
tumbuyn	_____	_____	_____	_____	_____
akesɨ azwaena	_____	_____	_____	_____	_____
atu	_____	_____	_____	_____	_____
ɨvɨmuytɨnɨ	_____	_____	_____	_____	_____
ãnfémtɨ	_____	_____	_____	_____	_____
agvɨl (a bola)	_____	_____	_____	_____	_____
mɨnji	_____	_____	_____	_____	_____
mbvɨtu	_____	_____	_____	_____	_____
akesɨ	_____	_____	_____	_____	_____
abvɨ a kejém	_____	_____	_____	_____	_____
nkaysɨ	_____	_____	_____	_____	_____
ɨyuŋ	_____	_____	_____	_____	_____
ɨlva yafɨnɨ	_____	_____	_____	_____	_____
alɨ	_____	_____	_____	_____	_____

_____ kae ku wayn/wãyn-wayn va lvɨyn, a wa mosɨ sɨ chu' tyae? A wa li fu asɨ afɨ ma, a wa ndu sɨ wul afɨ' ila ma, a wa ndu a health centre ma, a wa ndu a hospital ma, "or" Pa Njingo?

afo a woynda	_____	_____	_____	_____
ɨlva cho'nɨ	_____	_____	_____	_____
afo ichibɨ	_____	_____	_____	_____

Sex _____
Iyɨl izae nɨn ghɨ nda? _____
Last First
Wa ghɨ beŋsɨ se'a? _____
Wa n-kelɨ woyn ghɨ se'a? _____
Wa ndu a chos a? _____
Ikà? _____
Education? _____
Occupation? _____
Ecoscale: J _____ C _____ G _____ Quarter _____

Figure A–1 Treatment preference questionnaire



1. A ghɨ sûyn sa sɨ tal sɨ ka, a wa nyea nyaŋsɨ taŋi sɨ aŋena?
(Who are the 3 friends you talk to most.)

Name	Sex	Relation to you	Where live	Quarter

2. A ghɨ gheli isaendo ghɨ tal ghɨ ka, a wa nyea nyaŋsɨ taŋi sɨ aŋena?
(Who are the 3 relatives (outside of your compound) that you speak to most.)

Name	Sex	Relation to you	Where live	Quarter

1	Acha'aja	6	Mɨlumbo
2	Wombong up	7	Bɨmilɨ
3	Boyo	8	Nge'
4	Downtown	9	Mile 36
5	Mɨbvɨka	10	Mbanghibal

Figure A–2 Snowball network generator (done concurrently with preference survey).

Interview # ___
Interviewer ___
Date ____

Ecode (Ind) ___
Ecode (Comp) ___
Picture # ___

Pict #	Close	Rel.	Pict #	Close	Rel.	Pict #	Close	Rel.
1	___	___	48	___	___	95	___	___
2	___	___	49	___	___	96	___	___
3	___	___	50	___	___	97	___	___
4	___	___	51	___	___	98	___	___
5	___	___	52	___	___	99	___	___
6	___	___	53	___	___	100	___	___
7	___	___	54	___	___	101	___	___
8	___	___	55	___	___	102	___	___
9	___	___	56	___	___	103	___	___
10	___	___	57	___	___	104	___	___
11	___	___	58	___	___	105	___	___
12	___	___	59	___	___	106	___	___
13	___	___	60	___	___	107	___	___
14	___	___	61	___	___			
15	___	___	62	___	___			
16	___	___	63	___	___			
17	___	___	64	___	___			
18	___	___	65	___	___			
19	___	___	66	___	___			
20	___	___	67	___	___			
21	___	___	68	___	___			
22	___	___	69	___	___			
23	___	___	70	___	___			
24	___	___	71	___	___			
25	___	___	72	___	___			
26	___	___	73	___	___			
27	___	___	74	___	___			
28	___	___	75	___	___			
29	___	___	76	___	___			
30	___	___	77	___	___			
31	___	___	78	___	___			
32	___	___	79	___	___			
33	___	___	80	___	___			
34	___	___	81	___	___			
35	___	___	82	___	___			
36	___	___	83	___	___			
37	___	___	84	___	___			
38	___	___	85	___	___			
39	___	___	86	___	___			
40	___	___	87	___	___			
41	___	___	88	___	___			
42	___	___	89	___	___			
43	___	___	90	___	___			
44	___	___	91	___	___			
45	___	___	92	___	___			
46	___	___	93	___	___			
47	___	___	94	___	___			

Closeness:
0 Don't know.
1 Greets person.
2 Talks about general topics.
3 Talks about personal topics.

Relatives:

a	woyna wom
b	bowom; na bowom
c	nabè; bobo
d	nawom; wayn nawom;
e	lums-i na wom
f	bo nawom; na nawom
g	wayn wom
h	wayn wayn wom
i	wayn bo wom
j	wayn jemt-i s-i bo wom
k	wayn ghem
l	wayn lums-i nawom
m	wayn jemt-i yem
n	wayn lums-i yem
o	lum wom
p	wi wom
q	bo wi n-ima; na wi n-ima
r	bo lum n-ima; na lum n-ima
s	wul aseando
u	suyn yem

Figure A–3 Network questionnaire (closeness & kinship).

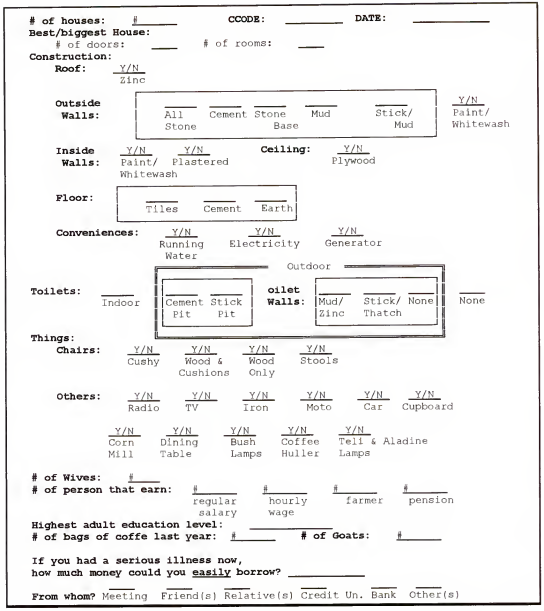

# of houses: #
CCODE:
DATE:
Best/biggest House:
# of doors:
# of rooms:
Construction:
Roof: Y/N Zinc
Outside Walls: All Stone, Cement, Stone Base, Mud, Stick/ Mud, Y/N Paint/ Whitewash
Inside Walls: Y/N Paint/ Whitewash, Y/N Plastered
Ceiling: Y/N Plywood
Floor: Tiles, Cement, Earth
Conveniences: Y/N Running Water, Y/N Electricity, Y/N Generator
Outdoor
Toilets: Indoor
Cement Pit, Stick Pit
oilet Walls: Mud/ Zinc, Stick/ Thatch, None
None
Things:
Chairs: Y/N Cushy, Y/N Wood & Cushions, Y/N Wood Only, Y/N Stools
Others: Y/N Radio, Y/N TV, Y/N Iron, Y/N Moto, Y/N Car, Y/N Cupboard
Y/N Corn Mill, Y/N DIning Table, Y/N Bush Lamps, Y/N Coffee Huller, Y/N Teli & Aladine Lamps
# of Wives: #
# of person that earn: # regular salary, # hourly wage, # farmer, # pension
Highest adult education level:
# of bags of coffe last year: # # of Goats: #
If you had a serious illness now,
how much money could you easily borrow?
From whom? Meeting Friend(s) Relative(s) Credit Un. Bank Other(s)

Figure A–4 Complete economic survey.

New Code: ___ **Ccode:** ___ **Date:** _____

0 = No education
0 + Class = Class code
7 + Form = Form code
12 + years = HighSchool code
14 + years = University code

3 = Standard I & II
4 = Standard III
5 = Standard IV
6 = Standard V
7 = Standard VI

Adults

Males			Females		
Age	**Name**	**Educ.**	**Age**	**Name**	**Educ.**
51+			51+		
26-			26-50		
16-			16-25		

Children

Ages	**Boys**	Girls
12-15		
5-11		
0-4		

Compound Wealth

Best House:	**Response**	
1. # of Rooms	#	
2. # of Doors	#	
3. Outside walls painted?	Yes	No
4. Cement or Tile Floors?	Yes	No
5. Inside walls Plastered?	Yes	No
6. Inside walls Painted?	Yes	No
7. Electricity?	Yes	No
8. Dining Room Table?	Yes	No
9. Chairs with cushions?	Yes	No

Figure A–5 Random demographic and economic survey.

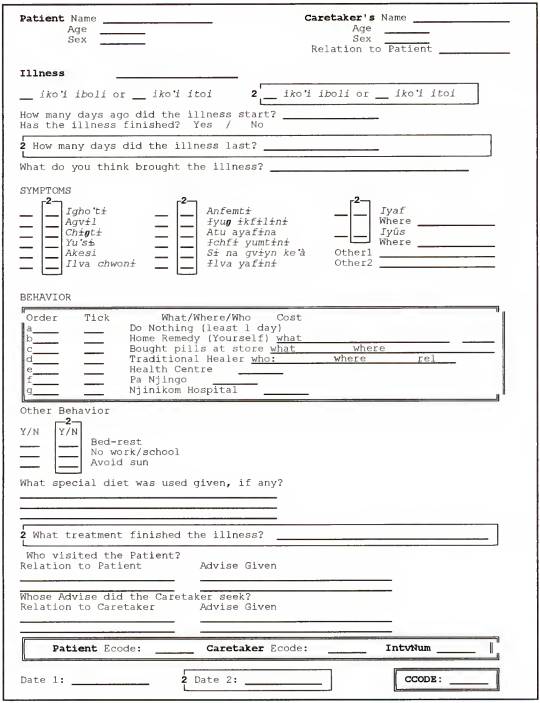


Figure A–6 Illness Episode (Behavior Survey).

NAME: _____ **ECODE:** ___ **CCODE:** ___ **DATE:** ____

1. Do you know how to make any country **m**edicines? 2. For what?
3. Do you know anyone that makes country medicine for ____?
4. Is this person related to you? 5. Is this person a *wul afi- i-la*?
6. Does this person live in this compound? 7. What sex is this person?

	Self	Know	Relative	Healer	Compound	Sex
afo a woynda (side pain)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
agvi-l ato (high fever)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
agvi-l (fever)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
akesi azwena (brthing cough)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
akesi (cough)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
alvi- a yafi-na (knee pain)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
angvi- (epilepsy)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
ansasi (leprosy)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
asi- a yafi-na (eye pain)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
atu (headache)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
atu a chwoti-na (hi headache)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
atunji- a yafi-na (ear pain)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
ayus (itching)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
ighasaghasa (ring worm)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
ija' (madness)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
e (skin illness)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
ise' (goitre)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
isoŋ i yafi-ni (tooth pain)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
mbvi-ti- (measles)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
mi-mi- (boils)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
mi-nji (gonnorhea)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
ngwosi- (cancer)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
nka' (scabies)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
nkaysi- (scabies)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
i-chfi- i- fi-dwo' (chest pain)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
i-jem i yafi-ni- (back pain)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
i-lva cho'ni- (diarrhea)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
i-lva yafi-ni- (stomache ache)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
i-vi-muyti-ni- (swollen feet)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
i-yuŋ (joint pain)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
ti-ghoŋawoŋ (worms)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F
tumbuyn (dysentary)	Y / N	Y / N	Y / N	Y / N	Y / N	M/F

Healers Name **Village** **Where live**

1_____ _____ _____
Cures: _____
2_____ _____ _____
Cures: _____
3_____ _____ _____
Cures: _____
4_____ _____ _____
Cures: _____

Figure A–7 Lay knowledge of traditional healers.

NAME: _____ ECODE: ___ CCODE: ___ DATE: ____

You said you knew how to cure the following diseases:

Who taught you this cure?

1. Is the person related to you and if so how?
   - 0 = No relation
   - 1 = brother, sister, cousin
   - 2 = mother, father, uncle, aunt
   - 3 = grand-father, grand-mother, great-uncle, great-aunt
   - 4 = other
2. Does the person live in this compound?
3. Is this person a healer?
4. What sex is the person?
5. Did you have to give anything to learn this cure?
6. Do you treat people from outside the compound?

	Who	Compoud	Healer	Sex	Give	Outside
afo a woynda	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
agv-il ato	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
agv-il	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
akesi azwena	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
akesi	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
alv-i a yaf-ina	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
angv-i	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
ansasi	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
as-i a yaf-ina	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
atu	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
atu a chwot-ina	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
atuŋ-i a yaf-ina	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
ayus	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
ighasaghasa	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
ija'	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N

	Who	Compoud	Healer	Sex	Give	Outside
ise	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
ise'	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
isoŋ i yaf-ini	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
mbv-it-i	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
m-im-i	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
m-inji	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
ngwos-i	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
nka'	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
nkays-i	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
-ichf-i -i fidwo'	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
-ijem i yaf-in-i	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
-ilva cho'n-i	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
-ilva yaf-in-i	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
-iv-imuyt-in-i	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
-iyuŋ	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N
t-ighoŋawoŋ	0 1 2 3 4	Y / N	Y / N	M / F	Y / N	Y / N

Figure A–8 Lay knowledge of home remedies.

Name of Establishment: _____ **Date:** _____

	mg	CFA	mg	CFA	mg	CFA
760 (M&B Thiazamine)	___	____	___	____	___	____
Ampecilline	___	____	___	____	___	____
Aspirin	___	____	___	____	___	____
Atomic (China) Rub	___	____	___	____	___	____
Batrim	___	____	___	____	___	____
Bonacide	___	____	___	____	___	____
Chloroquine	___	____	___	____	___	____
Endometacine	___	____	___	____	___	____
Ephadrine	___	____	___	____	___	____
Flagyl	___	____	___	____	___	____
Freedom Balm	___	____	___	____	___	____
Laxative	___	____	___	____	___	____
Levamisole (katex)	___	____	___	____	___	____
Metranidazole	___	____	___	____	___	____
Multi-vites	___	____	___	____	___	____
Nivaquine	___	____	___	____	___	____
Opetidon	___	____	___	____	___	____
Oxitetracycline	___	____	___	____	___	____
Panadole	___	____	___	____	___	____
Paracetamol	___	____	___	____	___	____
Penecillin	___	____	___	____	___	____
Phansidar	___	____	___	____	___	____
Phensic	___	____	___	____	___	____
Phenylbutazone	___	____	___	____	___	____
Procine	___	____	___	____	___	____
Quinimax	___	____	___	____	___	____
Raglo	___	____	___	____	___	____
Small-No-Be-Sick (essent)___		____	___	____	___	____
Tetracycline	___	____	___	____	___	____
Other1 _____	___	____	___	____	___	____
Other2 _____	___	____	___	____	___	____
Other3 _____	___	____	___	____	___	____

Figure A–9 Pharmaceuticals availabe in local establishments.

NAME: _____ **ECODE:** ___ **CCODE:** ___ **DATE:** ____

1. **Wà n-kya ghi-ki ghi- se'a ta aŋena bvi- si- zi-ti- ta ghi- yi- "New Year"?**
How many women do you know that put to birth since New Year?

a. __ **TOTAL**
b. __ **a ndo àfi- i Njinikom a?**
at Njinikom hospital?
c. __ **a "Health Centre" i- Fuanantui a?**
at Funuantui Health Centre?

2. __ **Wà n-kya ghi-ki ghi- se' a ta àŋena ni-n keli- i-mbwâ'si- a?**
How many women do you know who have twins?

3. __ **Wà n-kya (woyn) i-mbwâ'si- ghi- sè' a?**
How many twins do you know?

4. __ **Wà n-kya gheli- ghi- sè' ta ghi- nyiŋsi- a ndo àfi- i Njinikom a si- zi- ta ghi- yi- New Year?**
How many people do you know that were admitted to the Njinikom hospital since New Year?

5. __ **Wà n-kya gheli- ghi- sè' ta aŋena ndu a "Health Centre" (Fuanantui) si- zi- ta ghi- yi- "New Year"?**
How many people do you know that were admitted to the Health Centre since New Year?

Wà kya gheli- ghi- sè'a ta aŋena yàfi- meyn ni- ____ i-we ghâyn a wu ti chwò a?
How many people do you know that have been caught by ____ in the last week?

6. __ *afo a woynda*
7. __ *agvi-l ato*
8. __ *akesi*
9. __ *mbvi-ti-*
10. __ *i-lva cho'ni-*
11. __ *atu a chwoti-na*
12. __ *agvi-l*
13. __ **Wà n-kya gheli- ghi- sè'a ta "AIDS" timi ku a?**
How many people do you know that have been caught by AIDS?

14. Y/N **"AIDS" ni-n ghi- n-kàyn iko'i a?**
Do you think AIDS is a real illness?

15. Y/N **Ghi- kà'a ghi- chu' "AIDS" a?**
Can AIDS be cured?

16. **Wà kà'a wà ni gha na ka AIDS ku va?**
Do you know anything that can prevent you from getting AIDS?

_____

17. Y/N **Condomsi- (rainboots) kà'a si- ni na ka AIDS ku wul a?**
Do you think that using condoms helps prevent AIDS?

18. Y/N **Wà "use" condomsi- a?**
Do you use condoms?

Figure A–10 Estimator of network size and lay knowledge of AIDS.

NAME: _____ ECODE: ___ CCODE: ___ DATE: __

1. **Iko'i nâ yèni ni-n ghi- iko'i i bol i ma à n-ghi- iko'i i to i ma, yi n-to wi — bol i- wi a?** (Is this illness a weak, neutral or strong illness?)

   A) **Yi kaesi- nà bol a, wa fè'ti- nâ yi n-bol nô ajûŋ ma yi n-bol ki- si lae a?** (If it is Weak, is it very weak or somewhat weak?)

   B) **À kasi- nà ghi- iko'i i to i, wa fè'ti- nâ yi n-to nô ajûŋ ma yi n-to ki- si lae a?** (If it is Strong, is it very strong, or somewhat strong?)

	BOL	TO WI — BOL WI			TO
	Fi-ko'ili-	Bol		To	To no ajung
afo a woynda (side pain)	1	2	3	4	5
agvi-l ato (high fever)	1	2	3	4	5
agvi-l (fever)	1	2	3	4	5
akesi azwena (brthing cough)	1	2	3	4	5
akesi (cough)	1	2	3	4	5
alvi- a yafi-na (knee pain)	1	2	3	4	5
angvi- (epilepsy)	1	2	3	4	5
ansasi (leprosy)	1	2	3	4	5
asi- a yafi-na (eye pain)	1	2	3	4	5
atu (headache)	1	2	3	4	5
atu a chwoti-na (hi headache)	1	2	3	4	5
atuŋli- a yafi-na (ear pain)	1	2	3	4	5
ayus (itching)	1	2	3	4	5
ighasaghasa (ring worm)	1	2	3	4	5
ija' (madness)	1	2	3	4	5
ise (skin illness)	1	2	3	4	5
ise' (goitre)	1	2	3	4	5
isoŋ i yafi-ni (tooth pain)	1	2	3	4	5
mbvi-ti- (measles)	1	2	3	4	5
mi-mi- (boils)	1	2	3	4	5
mi-nji (gonnorhea)	1	2	3	4	5
ngwosi- (cancer)	1	2	3	4	5
nka' (scabies)	1	2	3	4	5
nkaysi- (scabies)	1	2	3	4	5
i chfi- i fi-dwo' (chest pain)	1	2	3	4	5
i jem i yafi-ni- (back pain)	1	2	3	4	5
i lva cho'ni- (diarrhea)	1	2	3	4	5
i lva yafi-ni- (stomache ache)	1	2	3	4	5
i vi muyti-ni- (swollen feet)	1	2	3	4	5
i yuŋ (joint pain)	1	2	3	4	5
ti-ghoŋawoŋ (worms)	1	2	3	4	5
AIDS (CIDA)	1	2	3	4	5

Figure A–11 Ratings of illness severity.

NAME: _____ **ECODE:** ___ **CCODE:** ___ **DATE:** ___

1. We want to see how strong different illnesses are.

The red line on the ruler shows how strong akesi is. Draw a line showing how strong the other illnesses are. For example, if nime' (mumps) is stronger than akesi, draw a line that is longer. (If it is much stronger draw a line that is a lot longer. If is only a little stronger, draw a line that is a little longer.) If nime' is weaker than akesi, draw a smaller line.

Practice:
nime' (mumps)
anfef (blindness)

---

afo a woynda (side pain)
agv-il ato (high fever)
agv-il (fever)

akesi azwena (brthing cough)
anfemt-i (catarrh)
alv-i a yaf-ina (knee pain)
angv-i (epilepsy)
ansasi (leprosy)
as-i a yaf-ina (eye pain)

atu (headache)
atu a chwot-ina (hi headache)
atuŋl-i a yaf-ina (ear pain)
ayus (itching)
ighasaghasa (ring worm)
ija' (madness)

ise (skin illness)
ise' (goitre)
isoŋ i yaf-ini (tooth pain)
mbv-it-i (measles)
m-im-i (boils)
m-inji (gonnorhea)

Figure A–12 Magnitude scaling of illness seriousness.

NAME: _____ ECODE: ___ CCODE: ___ DATE: ____

To be asked to seller of Drugs:

If some one comes with the following illnesses, what (drugs, how much, and how often) do you recommend. Do this for adults and children.

afo a woynda
agvɨ-l ato
agvɨ-l
---
akesi azwena
akesi
atu
---
atu a chwoti-
ayus
ise
---
isoŋ i yafi-n
mbvɨ-ti-
mɨ-nji
---
nka'
nkaysɨ-
ɨ-chfi- ɨ- fi-dwo

ɨ-jem i yafi-ni-
ɨ-lva cho'ni-
ɨ-lva yafi-ni-

ɨ-yuŋ
ti-ghoŋawoŋ

Figure A–13 Store owner knowledge of pharmaceuticals.

NAME: _____ ECODE: _____ CCODE: _____ DATE: _____

	Niva-quine	Para-cete.	Phen-sic	Asp-rin	Pen-cillin	760	Ampe-cillin	Chloro-quine	Camo-quine	Pana-dol	Cap-sule	Nota-zine
	—	—	—	—	—	–	—	—	—	—	—	—
afo a woynda	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
agvɬi ato	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
agvɬi	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
akesi azwena	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
akesi	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
atu	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
atu a chwotɬ	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
ayus	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
ise	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N

	Niva-quine	Para-cete.	Phen-sic	Asp-rin	Pen-cillin	760	Ampe-cillin	Chloro-quine	Camo-quine	Pana-dol	Fla-gyl	Nota-zine
	—	—	—	—	—	—	—	—	—	—	—	—
isoŋ i yafɬn	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
mbvɬtɬ	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
mɬnji	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
nka'	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
nkaysɬ	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
ɬchfi ɬ fidwo	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
ɬjem i yafɬnɬ	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
ɬlva cho'nɬ	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
ɬlva yafɬnɬ	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
ɬyuŋ	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
tɬghoŋawoŋ	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N

Figure A–14 Lay knoweledge of pharmaceuticals.

1. **Attention**
   - a. **Social Context (à la Janzen)**
     - i. **Specific Illness**
       - (1) Who first noticed that the patient was ill?
         - (a) How are they related to patient?
         - (b) What things they notice?
         - (c) What did this person do?
         - (d) Did they tell the caretaker?
         - (e) Did they try to take care of the illness themselves?
       - (2) Caretakers
         - (a) Who is the primary caretaker?
         - (b) Who else has helped with the caretaking?
         - (c) What did these other people do to help?
     - ii. **General Illness**
       - (1) Who usually cares for people that are sick in the compound?
         - (a) Why?
       - (2) Who decides when the sickness is above people in the compound?
       - (3) Who decides when to go to the health centre, the hospital or a traditional healer?
   - b. **Normality**
     - i. How did you (the caretaker) notice that the patient was sick?
       - (1) What was the very first thing that you noticed about the patient?
       - (2) What other things did you notice?
     - ii. How does the patient act normally?
       - (1) Is the patient often sick?
       - (2) What sickness usually hold the patient?
     - iii. Does this particular illness always come in this manner?
       - (1) How this illness episode typical of this kind of sickness?
       - (2) How was this illness episode different from normal?

2. **Waiting**
   - a. How long did you observe this symptoms before doing anything?
     - i. Why?
     - ii. Do you always wait?
   - b. Does this kind of illness ever go away on its own?

3. **Illness Categories**
   - a. Kinds
     - i. How did you know it was this kind of illness?
       - (1) If there are several illness:
         - (a) How could you tell it was each illness?
         - (b) Which illness came first?
         - (c) How did you know what illness came first?
       - (2) How did you know that it was this illness as opposed to some other? [Do compare and contrast between similar illnesses, like akesi and anfemti.]
     - ii. Did you ask anybody what the illness was (seek an outside diagnosis)?

Figure A–15 Interview guide for decision-making survey – recognition.

b. Causes
- i. Why do you think these illnesses came?
  - (1) If they don't know, ask about what usually brings this particular illness or about what causes illnesses in general.
  - (2) Can you do anything to avoid this kind of illness?

4. Goals

a. Non-Medical
- i. Who did you tell that the person was sick?
  - (1) Why?
- ii. Who else knew that the person was sick?
  - (1) How did they find out that the person was sick?

b. Cure
- i. Did you know something that would finish the illness, or did you think that the illness would finish on its own?
  - (a) Why did you think this?
  - (1) Did you worry that the illness would bring other illnesses?
  - (2) How easy is it to finish this kind of illness?
  - (3) Have you dealt with this kind of illness before?

c. To make patient feel comfortable
- i. What did you do to make the patient feel better?
  - (1) Do you always do this?
  - (2) Why?
- ii. Did people treat the patient special?
  - (1) What did they do for the patient?
  - (2) Who did this?
  - (3) Why did they do it?

Figure A–15 Continued.

1. Scripts
- a. Has this illness caught you before? Or have you ever treated this illnes?
  - i. What did you do the last time?
  - ii. do you always do the same thing for the illness?
    - 1) Why?
    - 2) How did you learn about this treatment?
    - 3) Who told you that this treatment was good for finishing this particular illness?
  - iii. Was this illness different from last time?
    - 1) How?
- b. What other illnesses is this treatment good for?
  - i. Where did you learn about this treatment?
  - ii. Do you know anyone else that uses this treatment for this illness?

2. Choice
- a. Goal Categories
  - i. What treatments are good to finish this illness?
  - ii. What other treatments did you think of doing?
- b. Search
  - i. Memory
  - ii. Trap
  - iii. Passive
  - iv. Active

3. Selection.
- a. Access
  - i. Salience
  - ii. Past Experience
  - iii. Preference
- b. Simultaneous Choices
- c. Delay

4. Evaluation
- a. Expectations
- b. Length of waiting
- c. Learning

5. Behavior
- a. Self treat
  - i. Wait
  - ii. Home
  - iii. Pill
  - iv. Special Diet
- b. Traditional
- c. Western
  - i. Health Clinic
  - ii. Pa Njingo (nurse)
  - iii. Hospital

Figure A–16 Interview guide for decision-making survey – alternative consideration, selection, evaluation, and practices.

APPENDIX B
HOME REMEDIES AND PHARMACEUTICALS USED BY CAREGIVERS

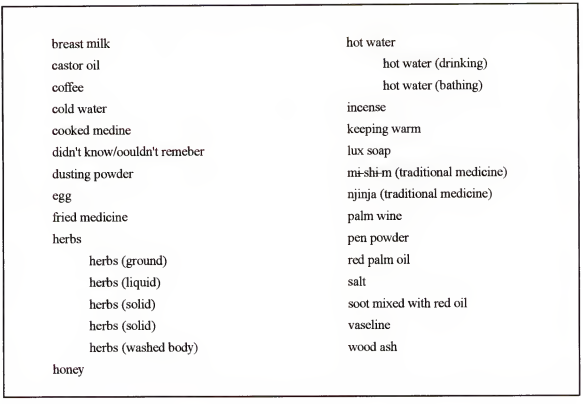


Figure B–1 Home remedies mentioned by informants during illness episode survey (N=454).

760 (sulphadimidine)	falmocid, phenlybuzene	phansidar
ampeseline	flagyl	phensic (brand of aspirin)
antibiotic	freedom balm	quinimax
aspirin	gold medal	quinine
atomic rub (small-no-be-sick)	injection	red tablets–didn't know name
camoquine	iodine	sloan liniment
capsule	laxative	tablets
chloroquine injections	nivaquine	tapone (was in house)
chloroquine tablets	pain reliever	tetracycline
cough medicine	panadole	triamini
didn't know	paracetamol	u.p.r.
endometacine tablets	penecillin (injections)	vicks
essential balm	penecillin (tablets)	worm medicine
eye drops	pentar (prescibed by seller)	yellow capsule–didn't know

Figure B–2 Pharmaceutical products mentioned by informants during illness episode survey (N=454).

APPENDIX C
PROCESS APPROACH TO HOME CASE MANAGEMENT

Unlike the *determinant approach* to home care management (HCM), a *process approach* attempts to explain how caretakers make decisions about health care. The general mechanisms for how people make health choices are grounded in work from psychology, anthropology and sociology. Psychologists have insights into how people react to ill-defined problems (like illnesses) and how people process information while making choices under uncertainty. Anthropologists and sociologists have provided insights into the stages of behavior as people confront problems of illness.

In this appendix, I briefly review the psychological literature on ill-defined problems and general decision-making stages. I then examine early decision models of health-seeking behaviors derived by anthropologists and sociologists. Finally, I draw from these works to create a *decision-making framework* for describing how people react to illness episodes. The framework divides the decision process into four stages: recognition, consideration of alternatives, selection of alternatives, and evaluation of results. The framework is a heuristic device. It describes the cognitive process through which nonmedical people go when confronted with illness. It lets us develop specific hypotheses for testing.

A decision-making framework offers several important insights into HCM. First, the framework views HCM as a layperson's quest to identify and solve health problems. A problem-solving approach remains focused on explaining how people arrive at

particular solutions to such problems. In other words, the subject to be explained (the dependent variables) are health actions; not beliefs, knowledge, or intentions.

Second, a decision-making framework is dynamic. Illnesses unfold over time and space. As illness episodes progress, both the characteristics of the illness and the conditions in which an illness occurs may change. In this frame work, caretakers react to a dynamic problem, and their experience with any single illness episode adds to both in their own and to the community's, evolving experience. The experience affects an individuals' reactions to illnesses encountered later.

Third, a decision-making framework integrates individual and group-level dynamics by considering what information caretakers use in choosing treatments and where the information comes from. Ultimately, individuals, not groups, are the actors in HCM. The group surrounding the individual, however, influences what information the person has and how this information is evaluated.

Fourth, the framework shows how the material, structural, and cognitive determinants reviewed in Chapter 2 ultimately influence behavior patterns. Motivational and predispositional factors (e.g. individual differences in values, personality, attitudes, involvement, and affective states) and socio-environmental factors (e.g. group membership, ethnicity, access to resources, and social obligations) also affect behavior at different phases of the process. See Cohen and Chakravarti (Cohen and Chakravarti 1990) for an extensive review of perceptual/cognitive, motivational and predispositional, and socio-environmental approaches to issues in consumer behavior.

In sum, the framework describes the *decision-making process as the mechanism by which individuals respond to particular* illnesses.

HCM as an Ill-Defined Decision Problem

Home care management (HCM) of illnesses requires laypeople to make ill-defined decisions. Such decisions occur when decision makers do not have a clear idea about goals, alternatives, or outcomes to the problems they confront (Abelson and Levi 1985). Decisions made during HCM are particularly characterized by *uncertainty*.[1] The classic understanding of uncertainty is the inability to assign specific probabilities to outcomes (Luce and Raiffa 1957). Broader definitions, however, note that a decision maker may be uncertain about: a) how to define the problem; b) the outcomes and their probabilities; c) the alternative actions and choices; or d) the payoffs or values attached to the action/outcome pairs (Conrath 1967).

Individuals deal with ill-defined decision problems by trying to reduce uncertainty during the different decision-making phases. That is, the decision making process "is an attempt to transform an ill-defined decision problem into a well-defined one" (Abelson and Levi 1985:270). Individuals use internal cognitive structures to receive, organize and retrieve information.

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[1] Uncertainty is a particular type of risky decision. In risky decisions, the decision maker is confronted with probabilistic outcomes. Lotteries and gambling are salient examples of risky decisions. Unlike gambling, however, where the probabilities are known (or at least knowable), decisions under uncertainty occur when the decision maker does not know the probabilities, and if fact, cannot calculate them. Many of our daily decisions are uncertain in that we cannot know with certainty the results of our choices.

> Cognitive structures are organizations of conceptually related representations of objects, situations, events, and of sequences of events and actions. What is stored in a cognitive structure can be the specific elements and features defining the object, event or situation or it can be the rules defining the interrelationships among the elements, or both. Cognitive structures derive from past experiences with the many instances of complex concepts they represent. Cognitive structures simplify when there is too much, and thus they allow the perceiver to reduce an enormously complex environment to a manageable number of meaningful categories. They fill in where there is too little and allow the perceiver to go beyond the information given. These structures help the perceiver achieve some coherence in the environment and in the most general sense provide for the construction of social reality (Markus and Zajonc 1985:143).

Markus and Zajonc (1985) refer to such cognitive structures as *schemata*. They note, however, that cognitive structures are given a variety of names, including: *themes* (e.g. Lingle and Ostrom, 1981), *scripts* (e.g. Abelson, 1976), *frames* (e.g. Minsky 1975), *categories* (e.g. Rosch 1973; Smith and Medin 1981), and *schemata* (e.g. Stotland and Canon 1972; Neisser 1976). *Scripts* are a particular type of schema in which a temporal sequence is expected (Schank & Abelson 1977, Abelson 1981). For reviews of psychological literature on schemata see Brewer and Nakamura (1984); Taylor and Crocker (1981); Hastie (Hastie 1981); and Markus and Zajonc (1985). For reviews of anthropological literature on schemata see Casson (1983).

A good example of cognitive structures that simplify complex situations is the diagnosis of illness (Frake 1961). The labelling of a complex set of signs and symptoms as a single illness helps the individual to define the problem, consider alternative actions, and calculate outcome probabilities.

HCM as a Decision-Making Process

Early Decision Models

Freidson (1959) was apparently the first researcher to view home care management as a series of behaviors in a social context. He noted that people first try home remedies then discuss their troubles with neighbors, friends, and fellow workers in a casual way and explore alternative explanations for the way they feel. Eventually, people may seek advice from others as to whether they should seek care and from whom. They may go to a doctor on a trial visit, comparing the diagnosis with their own conceptions and diagnoses made by friends and acquaintances.

> Indeed, the whole process of seeking help involves a network of potential consultants, from the intimate and informal confines of the nuclear family through successively more select, distant, authoritative laymen, until the "professional" is reached. This network of consultants, which is part of the structure of the local lay community and which imposes form on the seeking of help, might be called the "lay referral structure." Taken together with the cultural understandings involved in the process, we may speak of it as the "lay referral system" (1959:377-378).

Suchman (1965) moved away from the strictly behaviorist approach taken by Freidson and Polgar. He suggested five stages for the cognitive process in which people "shop" for medical care: 1) symptom-experiences; 2) assumption of the sick role; 3) medical care contact; 4) dependent-patient role; and 5) recovery/rehabilitation. In Suchman's framework, the lay referral system played a role in stages two, three, and four. These stages, however, were preceded by a cognitive recognition phase and followed by

a transition phase to normality. Suchman used data from a study in New York to support his framework.

Schwartz's (1969) study in Indonesia showed that laypeople followed a variety of behavior patterns, not just the stereotypical patterns outlined by Freidson and Polgar. Schwartz examined the *hierarchy of resort* in treatment selection by examining which of three treatments modalities people used first and second. Schwartz observed that each of the three treatment modalities could occur in any position.

In contrast to Freidson and Polgar, other researchers have used nonbehavioral frameworks to account for HCM practices. While examining hospital utilization in Boston, Zola (1973) noted that the following assumptions were untrue: a) individuals at most times during their life are asymptomatic; b) patients who seek aid from doctors have serious disorders; and c) those with serious symptoms, after an appropriate amount of time, would seek aid. To explain why these assumptions do not hold, Zola took a nonbehavioral approach to understanding what makes people decide to utilize hospitals. He posited five distinct nonphysiological "triggers" to the decision to seek medical aid. They included: a) the occurrence of interpersonal crisis; b) the perceived interference with social or personal relations; c) sanctioning; d) the perceived interference with vocational or physical activity; and d) a kind of temporalizing of symptomatology.

Fabrega (1973) outlined a framework for explaining HCM based on information processing and economic criteria. The framework: a) examines the information that laypeople evaluate and act on; b) accounts for the temporal ordering of health actions;

and c) tries to predict a limited number of alternative resolutions that can associate with an illness episode.

Fabrega divides the process into nine stages: 1) illness recognition and labling; 2) illness disvalue (cost of the illness); 3) treatment plans (known alternatives); 4) assessment of treatments (likelihood that plan would alleviate symptoms); 5) treatment benefits; 6) treatment costs; 7) net benefits of treatments; 8) selection of treatments (heuristic used to make selection, e.g. cheapest); and 9) recycling of decision-making process. Unlike earlier frameworks, Fabrega's process information model does not assume temporal behavioral sequences, but rather predicts sequences of health actions from nonbehavioral data. Fabrega's model, however, is more a static calculation of factors rather than a process that unfolds over time and space.

Many authors offer frameworks that mix the behavioral and cognitive processing approaches. Chrisman (1977) suggests five stages, including: symptom definition, illness-related shifts in role behavior, lay consultation and referral, treatment actions, and adherence. McKinlay (1972) posits a similar framework for explaining health service utilization patterns in the North America and Europe. Both emphasize the importance of the lay referral network on HCM practices.

Probably, the most detailed mixed framework is proposed by Igun (1979). His framework consists of 11 stages and includes: 1) symptom-experience; 2) self-treatment; 3) communication to significant others; 4) assessment of symptom; 5) assumption of sick-role; 6) expression of concern (other relatives come); 7) assessment of treatment efficacy; 8) selection of treatment; 9) treatment; 10) assessment of evaluation of effects;

and 11) recovery. The symptoms-experience stage includes physical experience and cue processing. Unlike Zola's "triggers", a cue does not suggest something sudden. Patients may skip the self-treatment stage if: they cannot label the illness, or they think it is too serious to handle themselves. In selection of treatment plan, patients usually select the least costly plan among the alternatives. Igun give two case studies from Nigeria to illustrate the model's validity.

The frameworks described above are inadequate. The mechanisms that lead to HCM practices should predict all behaviors; the framework should help us determine when people seek advice from lay referral networks and when they don't; and the behaviors of interest should be the results of the mechanism and not incorporated inside the framework. None of these criteria hold, of course. Fabrega's approach to HCM is a post-hoc analysis to predict what people do rather than a description of the cognitive process they go through when confronted with a problem. The trigger approach seems to be only one part of the larger cognitive process. Triggers may explain why people seek outside assistance, but they do not explain why certain outside assistance is chosen over other alternatives.

Decision Stages

Abelson and Levi (1985) review the psychological literature on decision-processing. They divide the decision process into three classic phases: problem recognition, identification of alternatives, evaluation of alternatives (Simon 1966). The process ends when the decision maker performs the choosen alternative. Unlike the Fabrega approach to information processing, Abelson and Levi suggest that the different

phases have differential influence on behavioral outcomes and there is no set economic rule that is followed.

To adapt the framework suggested by Abelson and Levi for understanding home care management, I have added a fourth stage–the evaluation of health action results. The framework for health care decisions includes the following fundamental stages:

- Illness recognition and problem formulation.
- Identification of alternative health actions.
- Evaluation and selection among alternative health actions.
- Evaluation of health action results.

Figure C–1 shows how these four stages interact. Each stage represent an important, though not necessary, step in reacting to illnesses. At any point during the process caretakers can return to previous stages or relinquish responsibility to other family members, therapy groups, or health care professionals.

The subsections that follow describe the role that each stage plays in the management process and the role that distal and proximate determinants play in each stage.

Illness Recognition and Problem Formulation

Illness recognition and *problem formulation* are part of the first and most important stage of the management process. (See Figure C–2.) Although *illness recognition* and *problem formulation* often occur simultaneously, they are distinct parts of the illness management process. *Illness recognition* occurs when caretakers recognize that something is wrong with the patient. *Problem formulation* is the process by which

caretakers label an illness as being a particular type of problem (*diagnosis*); select the desired state toward which they strive (*goals*); and pick a general method for accomplishing these goals (*strategies*).

Illness recognition.

Caretakers recognize some physiological and behavioral signs and ignore others. In general, caretakers recognize illnesses in one of three ways. First, people may encounter a salient and drastic event. For example, people quickly notice a problem when a friend faints and crumbles to the floor, or mothers are more likely to notice a child who is vomiting than a child with diarrhea.

Second, individuals may recognize an illness because they are monitoring certain symptoms that indicate departure from *normality* (Steinbruner 1974). As long as the symptoms remain close to normal, people do not perceive illnesses as problems. People consider many discomforts *normal* to everyday life and do not identify them as illness in need of a solution. For instance, in places where children often have colds, caretakers may fail to recognize a runny nose as a sign of illness. Normality is determined both by an individual's experience of illness frequency, and indirectly by social definitions of normality.

Third, people's concepts of their desired states of health change. For instance, as people move upward in social class, they may expect to be healthier and freer from discomforts. As health expectations increase, people identify previously ignored or unnoticed pains as illnesses.

Problem recognition depends on the decision maker's expertise and motivation. Novices and experts may differ in the types and amount of information they consider (Alba and Hutchinson 1987). Experts have the ability to restrict their attention to relevant information (Punj and Staelin 1983; Johnson, E. J. and Russo 1984). Novices, on the other hand, are more likely to pay attention to more salient (i.e. dynamic or distinct) attributes and are less likely to focus on attributes that are most relevant to the usage situation (Brucks 1985). Alba and Hutchinson (1987) note, however, that the expert-novice distinction may be attenuated by motivation. Researchers of health care have found similar discrepancies between laypeople and health specialists (Young, J. and Garro 1982; Weller 1983, 1984a, b; Garro 1986a).

Problem formulation.

After caretakers recognize that a problem exists, they must identify the illness (*diagnosis*); select the desired state toward which they strive (*goals*); and pick a general method for accomplishing these goals (*strategies*). These three substages make up *problem formulation*.

Diagnosis. In his study of the Subanun, Frake (1961) notes that

> Diagnosis --the decision of what 'name' to apply to an instance of 'being sick'--is a pivotal cognitive step in the selection of culturally appropriate responses to illness by the Subanun. It bears directly on the selection of ordinary, botanically-derived, medicinal remedies for 724 recorded alternatives. The results of this selection, in turn, influence efforts to reach prognostic and etiological decisions, which, in turn, govern the possible therapeutic need for a variant of one of 61 basic, named types of propitiatory offerings. All these decisions and resulting actions can have far-reaching social and economic consequences (1961:131).

Diagnosis occurs when individuals match relevant features in a particular illness episode with known patterns they have experienced or heard about from others. People extract salient symptoms and compare them to a set of *illness schemata*--cognitive representations of illness. How people match a particular episode with an illness category depends on the categorization processes used. Researchers identify three types of categorization processes: *classical, prototype, and exemplar* (Lingle et al. 1984; Alba and Hutchinson 1987; Cohen and Basu 1987).

Classical categories are defined by attributes that are necessary and sufficient for determining category membership. People often express these categories as rules. Frake argues that,

> because disease is not only suffered and treated, but also talked about, disease concepts are verbally labelled and readily communicable. Their continual exposure to discussions of sickness facilitates the learning of disease concepts by all Subanun....Since one cannot point to a disease entity and say 'That's a such and such,' as one can with a plant specimen, and since no one individual ever personally experiences but a fraction of the total number of diseases he can, in fact, differentiate, the Subanun themselves must learn to diagnose diseases through verbal description of their significant attributes. It is thus relatively easy for a Subanun to describe precisely what makes one disease different from another (Frake 1961:113-125).

Although such rules are good for communicating and for classifying easily definable and unambiguous concepts, whether individuals recognize a specific illness by rules remains to be tested.

In cases where there is a lot of variation, problem classification is likely to proceed on the basis of partial rule satisfaction. Prototype categories meet this criterion. Prototype categories are defined by a set of features commonly associated with members

of a category (Rosch and Mervis 1975; Mervis and Rosch 1981). The prototype can be thought of as either a combination of abstracted features common to the group members or a probabilistic rule. Instead of searching for necessary and significant features, this approach emphasizes a "goodness of membership." Membership is a matter of degree where some items are better members than others.

Although there is ample evidence that people use prototypical categories quite easily to classify natural and artificial objects (Berlin et al. 1968, 1973; Boster et al. 1986; Boster 1987), it is not clear what role they play in ill-defined problems. Prototypical categories appear more appropriate for categories that have many members than for small categories like those found in ill-defined decisions (Homa et al. 1981; Knapp and Anderson 1984). Other research suggests that when the concepts to be categorized are complex, individuals do not use rule-based and prototypical categories (Brooks 1978; Jacoby and Brooks 1984).

The third categorization process, the exemplar model, may be the most appropriate for ill-defined decisions. In the exemplar model, people classify a new item as belonging to a group if the new object is similar to a concrete category "exemplar." Exemplars are particular examples that people can easily recall. People probably classify ill-defined problems relative to past experiences or experiences they have heard about from friends and family. People's reliance on exemplar-based categories are similar to their reliance on *case*, rather than *base*, information in probability judgments (Kahneman and Tversky 1973).

Prototype categories rely on partial rule satisfaction where membership in the category depends on either abstracted features common to group members or a probabalistic rule. In exemplar categorization processes, people classify a new item as belonging to a group if the new object is similar to a concrete example that people can easily recall.

The categorization process that people use in defining illnesses depends on two social factors: the number of illness cases they have seen, and how much they share information about the illness with others. Laypeople who see few cases of particular illnesses rely heavily on exemplar-based processes. Laypeople classify illnesses according to past experiences or experiences they have heard about from friends and family. People's reliance on exemplar-based categories are similar to their reliance on *case*, rather than *base*, information in probability judgments (Kahneman and Tversky 1973). In contrast, the more cases of illnesses people are able to observe, the more prototypical the categorization process becomes. This occurs as examples fuse together. Prototypicality is a cognitively efficient way of accounting for variation.

The more people share information about illnesses, the more rule-based the categorization process becomes. Rules are easier than prototypic examplesto communicate. Thus, medical specialists who have formal and elaborate manners of communicating information about illnesses, (e.g., biomedicine), categorize illnesses by rules. In contrast, traditional healers, who may see many cases but may not talk with other healers, will classify illnesses prototypically. We should not be surprised that biomedical doctors use both rule-based and prototypic categories to diagnose their own

patients. Although they rely on rule-based categories to communicate efficiently, they base some of their decisions on prototypic categories they have learned from their own clinical experience.

The above argument is about "how people categorize." It is not about describing illnesses inside the categories. For example, two traditional healers from Africa and South American may both use prototypic categorization processes for diagnosing illnesses, but they may have different illness categories. The process of categorizing illnesses is a product of a person's structural position in society (i.e. how many illness cases they see, and how much they share information with others). In contrast, the study of the illnesses categories themselves belongs to the field of ethnomedicine. Which categories of illness people use dependents on whom they know rather than on what they do. In other words, direct and indirect social forces, not structural ones, most affect ethnomedicine classifications.

Most illness episodes are first recognized and tentatively diagnosed by laypeople. Categorizing an illness reduces psychological uncertainty by defining the problem in a particular manner, making it similar to other problems encountered before, filling in missing information through inferences, and suggesting alternatives. Laypeople who can't classify a particular illness either ignore the problem, or seek a diagnosis from other sources. People who have had little experience with illnesses are likely to rely on more experienced community members to diagnose illness. For instance, a young mother may ask her elders to help diagnose a child's illness and thereby formulate the problem.

Frake claims that Subanun use four kinds of criteria to label illnesses. Pathogenic criteria refer to the agent or mechanism that produces or aggravates an illness. In cases where identification of a pathogen is criterial to diagnosis, the association between the pathogen and the illness is relatively obvious both to the investigator and to his informants. Prodromal criteria are used for *derivative* diseases. Derivative diseases are those whose diagnosis depends on the illness having passed through specific stages (or other illnesses). Symptomatic criteria use the attributes of the illness that are currently perceptible to the patient or observer. Etiological criteria refer to "how the patient encountered a particular illness." That is "why did this happen to me?" rather than "what causes this kind of illness?"

Goals and strategies

Simply perceiving an illness does not mean that individuals will act. Laypeople must be motivated and perceive the capability to cure the illness. Perceived severity plays a major role in motivating people to act. Social factors, such as nonhealth-related obligations, community understandings of health threats, and medical expertise, also affect how people select goals and strategies for home care management. Mintzberg et al. (1976) suggest that the more individuals are burdened with ongoing decisions, the less likely they will act upon newly identified problems. For instance, mothers working during harvest may have little time to attend to a sick child. This could occur either because: a) people are unable to dedicate the time necessary to take care of an illness (Leatherman 1987); or b) people direct their attention elsewhere and they no longer recognize the illness.

Medical problems may suggest single or multiple goals and strategies. For example, when confronted with a medical problem, a caretaker may want to: a) *cure* the illness (where cure means eliminate the illnesses antecedent causes); b) alleviate illness symptoms; or c) help the patient *convalesce*. Different combinations of goals can lead to different behaviors. For instance, a mother might give her sick child antibiotics to cure an infection, *and* an aspirin to lessen the pain, *and* chicken soup because it is good for a convalescing child (Mathews 1987; Martínez and Saucedo 1991; Ryan and Martínez in press).

In addition, individuals will only act on problems that imply a genuine threat (Janis and Mann 1977). This may account for why a mother will ignore her own cold symptoms but quickly respond to those of her more vulnerable child. What counts as a threat to individuals, however, is indirectly tied to community perceptions of health risks.

General treatment strategies depend on the caretakers previous experience and expertise. Laypeople are likely to oversimplify complex host/insult interactions. They may treat a wide range of illnesses with a single strategy because this is the only strategy they know (e.g., aspirin cures everything). As caretakers gain experience, they develop strategies for better dealing with hidden complexities.

The goals and strategies are affected by differences in individual experience, expertise, and group membership. For instance, mothers in India frame the problem of infantile diarrhea as one of normalizing stool output via a series of treatments. Doctors frame the problem as one of preventing dehydration via the administration of liquids and

electrolytes. Different formulations of the problem lead to very different behavior patterns (Mull, J. Dennis and Mull 1988).

How specific goals and strategies are depends on the decision makers' previous experience and expertise. Novices are more likely to oversimplify complex problems and/or ignore hidden complexities in apparently simple problems (Alba and Hutchinson 1987). A novice may try to solve a complex problem with a very specific strategy because this is the only strategy they know (e.g. the novice that tries to do all home repairs with a hammer and a screwdriver). On the other hand, experts are better equipped to deal with hidden complexities. Consequently, an expert may initially use a general strategy to obtain a specific end (e.g. the professional plumber that hauls in all his tools to fix a leaky faucet).

Identification of Alternatives Health Actions

After caretakers recognize and structure a medical problem, they employ either a *script-based* or *choice-based* management processes (Schank and Abelson 1977). Figure C–3 shows that the two processes differ in their degree of automaticity. In scripted-based management, action follows almost automatically from illness recognition and identification. In contrast, choice-based management involves identifying and evaluating viable alternatives.

Script-based management

Script-based decisions are the simplest of the two selection processes. Scripts arises out of the work done by Schank and Abelson (1977) on stereotyped sequences of events such as eating in a restaurant, going to work, or visiting a doctor. In script-based

decisions, as soon people identify an illness, they immediately consider a *particular* treatment or a *series* of particular treatments. Unless a competitor comes to mind, the behavior quickly follows.

In script-based management, as soon a person identifies an illness, the illness category suggests either a *particular* treatment or a *series* of particular treatments. Unless a competitor comes to mind, the behavior quickly follows. In script-based management, people have no need to evaluate and select among treatments. For example, a mother may classify a child's illness as malaria. This may automatically bring to mind chloroquine as the proper treatment. Or the mother might classify her child's illness as a cold and automatically give the child warm tea and salt crackers, and send the child to bed. In each case, treatment is a short step from the problem recognition and formulation stage.

People may describe their script-based management as heuristics or rules of thumb. For instance, "Give chloroquine for malaria" or "A cold requires tea, bland foods, and bed rest." It is difficult to tell if people are actually using rules of thumb in their cognitive management process or if they use heuristics to describe habitual responses.

Script-based management is extremely adaptive for individuals. Scripts represent socially learned responses to illnesses. People formulate scripts because they are known to work. Most scripts are sanctioned by the community as appropriate behavior. Scripts, however, are more difficult to modify than choices. Program planners need to break habitual behavior patterns and then present caretakers with new or better alternatives.

Choice-based management

In contrast to script-based management, choice-based management occurs when people must consider several treatment alternatives (Kahneman et al. 1982). Choice-based management involves two steps: first caretakers generate a set of alternatives--a *consideration set*--from which to chose; second, caretakers select among the consideration set. Caretakers use choice-based management when they cannot classify an illness into a single category, or when an illness category does not bring to mind a single, dominant treatment or series of treatments. Laypeople are more likely to have problems classifying an illness than are experts. Laypeople may also consider various treatments if they have never had previous experience with the problem or if no particular solution has been markedly successful in the past.

At the onset of an illness people probably do not distinguish between problem formulation (diagnosis, goals, and strategies) and the generation of alternatives. Practitioners and laypeople alike link diagnosis and treatments in their minds. In a study of 233 organizations, Witte (Witte 1972) found that decision makers usually did not separate problem formulation (diagnosis) from alternative generation. McCall et al. (1982) noted that Witte's decision makers typically identified alternatives *while* diagnosing the problem. The connection between problem formation and the generation of alternatives is especially noticeable in the medical domain where diagnosis and treatments are intricately linked in the minds of doctors and laypeople. Little work has been done on how people represent alternatives.

The strong links between formulation of problem and identification of alternatives are probably related to goal-derived categories. Goal-derived categories are constructed to achieve particular ends (Barsalou 1985; Barsalou and Ross 1986; Schwanenflugel and Rey 1986). For example, the goal-derived category "things to do for a headache" may include: aspirin, tylenol, cold compresses, and a nap. Unlike taxonomic categories, membership in *goal-derived* categories is not determined by *family resemblance* (how similar a member is to all other members of the category). Instead, membership is determined by a) similarity to the "ideal" category member, and b) the frequency with which an item is encountered as a category member (frequency of instantiation) (Barsalou 1982).

It is an empirical question as to what degree illness labels suggest *particular* alternatives versus *general* alternatives. For example, does labeling the illness a *cold* bring to mind either: a) a particular remedy--mint tea; b) a particular set of remedies--a cough suppressant, a nasal decongestant, a mint tea and bed rest; c) a general type of remedy--teas; or d) particular multiple alternatives--mint tea or nasal decongestant. Researchers need to conduct further study as to how *levels* of illness categorization influence the generation of treatment alternatives. For instance, do the two different classifications "green diarrhea" and "yellow diarrhea" bring to mind the same or different treatment alternatives? And, are these alternatives different from those generated from the more general classification *diarrhea*?

Goal-derived categories are adaptive in that people can learn and change them quickly. Potential caretakers learn category members from observing others manage

illness episodes and then talking to people about their observations. Lists of what to do are easily transmitted between experts and novices. In developing countries, older caretakers (usually kin within the household) play an important role in imparting these lists of viable alternatives. For instance, a young woman usually learns from her mother or other peers how to treat infantile illnesses. By the time her own child has diarrhea, the young mother already knows a general list of things to do when her infant has diarrhea. The list can include teas, pills, and seeking a nurse. As the mother gains experience, the list of things to do for infantile diarrhea changes. The mother's familiarity with some treatments cause some items to become more salient in the list, while others drop away. Goal-derived categories are important mechanisms for retaining lessons learned from past experience. Researchers have observed that whether or not knowledge is accepted as true depends on from whom it is imparted (Rogers 1962, 1971, 1983).

Although there is little research on the relationship between categories of problems and identification of alternatives, research on categorization processes suggests that an individual's experience and expertise play an important role. For instance, experts distinguish among finer levels of categorization than do novices (Nedungadi and Hutchinson 1985; Alba and Hutchinson 1987). Experts also are likely to categorize along deeper (i.e. abstract) underlying principles than are novices (Chase and Simon 1973; Schoenfeld and Herrman 1982).

When seeking solutions to any problem, caretakers follow the *principle of least effort* and first try to find ready-made solutions. People use four types of search processes to find ready-made solutions: 1) memory search; 2) passive search (waiting for

unsolicited alternatives to appear); 3) trap search (e.g., letting personal contacts know that you are dealing with a particular problem); and 4) active search (directly seeking alternative solutions).

Each type of search requires different amounts of effort. Caretakers may devote more time searching for treatment alternatives to cure a patient in his or her economic prime than they would to cure an elderly person. They make take more pains to cure males than females. Time pressure may necessitate curtailing the search for treatments.

Memory search is the most common way to form a consideration set. Memory plays an important role in decision making by determining the size of the consideration set, the likelihood that particular alternatives are considered, and the composition of the consideration set (Alba et al. 1991). Research suggests that the size of consideration sets tends to be low, generally ranging from 2 to 8 alternatives (Reilly and Parkinson 1985; Hauser and Wernerfelt 1990). Part of the reason for small consideration sets lies in people's inability to hold many items in short-term memory (Miller 1956). Likewise, the number of alternatives generated also depends on how the decision problem is structured. Problems that have multiple goals are more likely to bring to mind multiple alternatives.

In ill-defined decision problems, the category to which the problem is assigned may restrict the number of options that come to mind (Abelson and Levi 1985). For example, "what-to-do-for-diarrhea" may bring to mind more alternatives than "what-to-for-severe-bleeding". In addition, research suggests that alternatives recalled first tend to inhibit the recall of other items (Nickerson 1984). In very unstructured problems, decision makers may concentrate their efforts on developing a single feasible alternative

which serves as a psychological anchor or point of reference for other alternatives. Decision makers may also reduce cognitive effort by reviewing alternatives one at a time and rejecting them if they fall short on important attributes (Soelberg 1967; Corbin 1980). The number of alternatives may depend on the importance of the decision. Time pressure may necessitate curtailing the search for alternatives and make decision makers conservative (Hansson et al. 1974; Wright 1974; Ben Zur and Breznitz 1981). Finally, experts may bring to mind more alternatives than novices. Besides having a broader understanding of the problem, experts are more likely to seek additional information as they are aware of more relevant attributes (Brucks 1985) and are better equipped to ask more specific questions about the problem (Miyake and Norman 1979).

Which alternatives are considered depends on the decision maker's prior experience, and his or her cognitive organization of the domain. It is well established that items that are preferred, familiar, or salient to an individual are more easily recalled (Nedungadi and Hutchinson 1985; Baker et al. 1986; Ward and Loken 1986; Alba and Hutchinson 1987). The more frequently a person uses a particular solution, the easier it is recalled. People also will bring to mind alternatives they used recently more quickly than those they have not used in a long time. In addition, the more salient an alternative, the easier it is to recall (Taylor and Fiske 1978). For example, a medical treatment composed of unusual ingredients may be easier to recall than one with common ingredients.

Categories also play an important role in memory. Items that are prototypical of a search category are more easily remembered (Freedman and Loftus 1971; Rosch and Mervis 1975). The effect of prototypicality on recall, however, may be limited to

taxonomic or taxonomic-like categories. Some research shows that goal-derived categories are less established in memory than taxonomic categories (Barsalou and Ross 1986). However, goal-derived categories can take on taxonomic-like qualities with extensive experience (Barsalou and Ross 1986; Ratneshwar and Shocker 1989). In addition to influencing what alternatives are recalled, categorical structures affect which alternatives co-occur in the consideration set (Alba et al. 1991).

The perceived seriousness of the problem affects the kind of search employed. People actively search for alternatives when they perceive the problem as threatening. People may use passive and trap searches for reoccurring problems like chronic illnesses, especially after alternatives they had tried earlier failed to solve the problem. If the problem has social repercussions (i.e. affects people other than just the decision maker), people are apt to use more active and trap searches.

Active searches and trap searches are likely to assure a "socially correct" response to the problem. They also provide the decision maker with social support and social justification for the decision made. Simonson (1989) found that consumers who have a need to justify their decisions, choose options that provide easy rationale. Active and trap searches are particularly common in medical decision making when primary caregivers seek out others for advice (Janzen 1975, 1978a; Good, C. 1987). This is often the point in the decision process where decisions move from an individual level to a group level.

In contrast to ready-made alternatives, self-designed alternatives are far more difficult to formulate. Decision makers probably only use self-designed alternatives when the problem is unfamiliar to them and when the decision maker is an expert. Novices who

encounter totally unfamiliar problems are likely to seek advice from outside sources rather than formulate their own alternatives.

Evaluation of Alternatives

Once decision makers identify the consideration set of treatments they must somehow select among them. (See Figure C–4.) Most research on medical decision making starts at this stage in the process. Researchers assume that people know and consider all treatments that are available in the community. Actually, much of the decision-making process has already been completed by this point. During the evaluation of alternatives, social forces play only an indirect role. Community members subtly influence how people evaluate alternative treatments overall and what specific attribute information individuals might use in selecting among treatment alternatives.

In medical decisions, laypeople usually make *memory-based choices* among various treatments.[2] They hold multiple types of information in memory about each of the treatments. To make a choice, decision makers process this information in two stages. First, they identify a limited set of information that they will use to chose among alternatives treatments. Then they employ a heuristic strategy to select among the alternatives. I examine each stage below.

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[2] Professional practitioners do not need to rely entirely on memory to make choices. Professional practitioners have access to a large body of stored literature on treatments and their results. Some times they use this external information to make choices.

Selective use of information.

Even in mundane medical decisions, there are dozens of *inputs* (i.e. chunks of information) available in memory and in the external environment that could *potentially* influence one's choice, but people only use a few of these on any given occasion.[3] To account for which *inputs* (e.g., an attribute, the memory of previous behavior or experience, one's attitude, or another's suggestion) decision makers use when making judgments or choices, Feldman and Lynch (Feldman and Lynch 1988) propose the following theoretical framework. They suggest that the likelihood that people use an Input A in a decision depends on how *accessible* and *diagnostic* the inputs are. Accessible inputs are those inputs that people easily bring to mind. Some inputs are more accessible than others in memory. Access in memory depends on such factors as salience, experience, and preference. Diagnostic inputs are those inputs that separate good alternatives from bad alternatives. Diagnosticity is also the mechanism by which a decision maker considers the goals of a decision problem. For example, a father selecting what food to prepare for his family's dinner may consider *taste* because it is readily accessible in memory. If, however, the goal is to provide a well-balanced meal, *taste* may not be as diagnostic as "nutritional content."

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[3] Alba et al. (1991) note that even in mundane consumer decisions, there are dozens of *inputs* (i.e. chunks of information) available in memory and in the external environment that could *potentially* influence one's choice, but only a few of these are actually used on any given occasion. Hoyer (1984) makes similar claims. After watching people place a box of laundry detergent in their shopping cart, Hoyer asked them why they had made that particular selection. Less than 10 percent of all shoppers gave more than one reason for their choice. The evidence above suggests that in many everyday decision tasks, people rely on uni-attribute models of choice. If this is correct, it becomes imperative to understand how decision makers select important attributes.

Cost, familiarity, and confidence in treatment efficacy are often diagnostic. J. Young (1980) found that cost and faith in treatment efficacy were important criteria by which people selected treatments. People can define efficacy in a number of ways, including: the ability to return the patient to health as quickly as possible, cost effectiveness, and the lack of side effects. Cost effectiveness may also be more diagnostic for lower class people than for upper class people.

Direct experience plays an important role in home care management, especially for laypeople who have little knowledge of the chances of a treatment actually working.[4] Depending on the degree to which laypeople try to reduce uncertainty, familiarity may be extremely diagnostic in ill-defined problems. People may consider familiar alternatives more certain than unknown alternatives, and therefore have a higher likelihood of being chosen.

A caretaker's confidence in treatment efficacy is often diagnostic. Confidence in treatment is an overall evaluation of how well the alternative works for a given problem.

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[4] Researchers have argued that direct experience strengthens attitudes toward an object and consequently increases attitude-behavior correlation (Fazio & Zanna 1978; Smith and Swinvard 1983). Berger and Mitchell (1989) suggest that decision makers perceive attitudes formed by experience as more reliable and thus as more diagnostic. Fazzio et al. (1989), however, suggest that attitude-behavior correlation increases because of increased attitude accessibility not because of diagnosticity. In contrast, Lynch et al. (1988) argue that stronger attitudes either act: a) as direct inputs as suggested by Wright (1975); or b) to select the alternatives considered. Though more empirical work needs to be done on this question, most researchers agree that prior experience tends to increase the probability of selecting a given alternative.

Caretakers base their confidence on either a) the treatment's effectiveness over a long period, or b) particular or salient examples (Tversky and Kahneman 1973).[5]

In addition, decision makers' perceptions of uncertainty also affect their choices. Typically, the more uncertain an alternative; the more likely it will be discounted. We know, however, that people are not good at judging certainties or probabilities. The *certainty effect* suggests that people are not good at estimating probabilities that are close to zero or certainty (Kahneman and Tversky 1979). Probabilities that are highly unlikely are either ignored or overweighed, while differences between high probabilities and certainty are either amplified or neglected. This suggests that even alternatives that have little or no chance of working are given "possibilityhood" (Kahneman and Tversky 1979). Dramatic salience may enhance possibilityhood. Accessibility may also affect people's estimation of probability. People may also use the *availability heuristic* to estimate probability of an event (Tversky and Kahneman 1973). This occurs when people estimate the probability by how easily events come to mind. (For a review of literature on judgment heuristics and biases under uncertainty see Kahneman et al. 1982.) Perceived confidence and uncertainty probably play a greater role when decision makers use overall evaluation rather than attributes to select among alternatives.

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[5] Tversky and Kahneman (1973) refer to these different uses of information as *rate-based* and *case-based* evaluations respectively. They suggest that the latter is far more prevalent in decision-making processes than the former. Confidence often plays an important role in choice by allowing people to discriminate between alternatives quickly and easily. This is particularly important in ill-defined problems, where the probability of an alternative solving the problem is not known. For example, J. Young (1980, 1981) found that people in a small Mexican village used their *faith* (confidence) in a cure as an important criterium for selecting among potential treatment practices.

An individual's overall evaluation of a treatment may be susceptible to indirect social effects. Norms for action are often expressed in terms of relative evaluations. For instance, "Tea is a good treatment for diarrhea," Or "tea is the *best* treatment for a cold." These beliefs and social statements permeate a community and probably influence individual's selection of treatments. Individuals may find that there are social consequences for going against such norms.

Since people acquire information over time, I suspect that individuals rely heavily on their overall evaluations of treatments. In some cases, however, people may evaluate treatments based on specific attributes. This is likely to occur when treatments have similar overall evaluations. It remains an empirical question as to when decision makers use such evaluations as attitudes, affect, confidence, and uncertainty, and when they use attribute information as inputs in a choice process. In ill-defined decisions, however, overall evaluations have the ability to make a complex choice much easier and more certain for the decision maker. To understand how people select treatments based on multiple attributes, we need to examine the decision-strategies or *choice heuristics*.

Choice heuristics

Choice heuristics are specialized strategies that help individuals make choices when confronted with a set of alternatives, each described by values on several attributes. Heuristics can be used alone or in combinations. They can be constructed on the spot or *a priori*. They involve different amounts of cognitive effort and they may be more or less efficient. Although there are many choice heuristics described in the literature (see Bettman et al. (1991) for a review), only four are particularly useful in medical decisions.

The *satisfying (SAT) heuristic* (Simon 1955) considers alternatives one at a time. People consider the value of a single attribute to see if it meets a predetermined cutoff point. They select the first treatment that reaches this cutoff. The SAT heuristic may be particularly useful when medical decision makers have to chose quickly.

The *lexicographic (LEX) heuristic* is also quite simple. After determining the most important attribute, decision makers examine the value of the attribute for all treatments. They chose the treatment with the highest value for the chosen attribute. Choosing the cheapest brand is an example of using the lexicographic heuristic. Note how the lexicographic heuristic requires that people consider attributes by degree of diagnosticity.

The *elimination-by-aspects (EBA) heuristic* also begins by selecting the most important attribute (Tversky 1972). Decision makers determine a cutoff level and then eliminate all treatments that do not meet the cutoff. They continue the process with the next most important attribute until only one alternative remains. For instance, a mother might first consider giving a pill to cure her child of infantile diarrhea but quickly reject this option because it is too expensive. The EBA heuristic is quite useful in ill-defined decision problems because it helps people to eliminate many of the alternatives quickly and easily. Reducing the number of viable treatments reduces uncertainty.

In the *majority of confirming dimensions (MCD) heuristic*, decision makers compare the values of all attributes for a pair of treatments. They keep the treatment with the most winning or better attribute values. They then compare the retained treatment with the next treatment in the consideration set until there is only one *winner*.

Decision makers may use the MCD heuristic when they encounter treatments sequentially. Tversky (Tversky 1969) suggests that people process alternatives displayed sequentially by alternative, while alternatives displayed side-by-side facilitate processing by attribute. In medical decisions, the identification and evaluation of treatments often occur iteratively (Mintzberg et al. 1976; McCall et al. 1982). Decision makers probably compare the new treatment to the best alternative encountered to date.

Decision makers also use combinations of the above heuristic. Typically, they employ an initial phase to remove poor treatments from the consideration set. Then they use a second phase to consider the remaining alternatives in more detail (Payne 1976; Gladwin 1989). Decision makers commonly use the EBA heuristic as a first-stage decision strategy.

Choice heuristic, however, may not be as influential in everyday ill-defined problems as they are in laboratory-controlled decision tasks. In everyday problems, much of the decision process has already been completed in the identification of both the problem and alternatives. In addition, multi-attribute heuristic may play a minimal role in choice processes where decision makers evaluate treatments based on a single attribute or attitude. Heuristics are probably the only part of the decision-making process that the individual wholly controls.

Other selection strategies

The actual selection of treatments is often the most difficult part of the management process. To chose one treatment often necessitates forgoing of others. The selection phase can be stressful, particularly when the individual must chose among

treatments that are close in overall value or when the illness has dire consequences. In some problems, the caretaker may choose to use two or more alternatives simultaneously if the costs of doing so are not too great. Or they may simply relinquish control of the illness management to a specialist or management group.

Because of the uncertainty of results, people confronting medical problems may anticipate trying various treatments before the illness stops. In this case, caretakers may try their most preferred alternative that meets all constraints. If this does not work, they will try the second most preferred treatment and so on. If caretakers do not solve the problem, they may re-evaluate the inputs they consider in the choice process (Ryan and Martínez in press).

Another selection strategy in illness management is one of delay. Caretakers probably refrain from making a selection until: a) the illness becomes critical and forces a decision; b) highly diagnostic information is available that overwhelmingly suggests a particular treatment; or c) another individual or group of individuals takes control of the decision. Delay strategies are especially prevalent when caretakers need to justify their actions or have many other obligations.

Evaluation of Health Action Results

Once caretakers select a treatment, they must decide whether the treatment worked. Though studied little, the evaluation of results is a critical phase in management of illnesses. (See Figure C–5.) How caretakers evaluate the results of a choice determines whether or not they try additional alternatives. In addition, the evaluation of the results

influence how both caretakers and community members will react to similar problems in the future.

As in illness recognition, people attend to differences in physiological and behavioral signs and social forces influence how people evaluate treatment results. These evaluations also create feedback mechanisms to three different social levels. At the level of the illness episode, the evaluations influence whether or not people terminate or continue the treatment process. If people determine that more treatments are needed, these evaluations influence the remainder of the management process. At the level of the individual, people store the evaluations in memory. These evaluations may influence future management choices. And finally, the results of the treatments are shared with other community members. Other community members may consider the evaluations in *their* future medical problems.

To understand how caretakers evaluate the results of their choices we need to ask three questions: 1) What do caretakers expect from a treatment?; 2) How long will they wait before seeking another treatment?; and 3) How do they perceive the results? The answers to these questions determine the number and range of treatments that caretakers try when caring for an illness. For instance, a mother may stop giving oral rehydration salts (ORS) to her child after the first day of treatment. She expects the treatment to slow stool output while the doctor expects the treatment to rehydrate the child. When stool output actually increases during the first 24 hours of treatment, the mother stops the ORS and seeks another remedy. To the mother, the treatment has failed, and she needs to administer another alternative.

As in illness recognition, both biological and social factors play important roles in how people perceive and evaluate results. After people administer treatments, they monitor the results. People expect to see a change in either the patient's physical symptoms or behavior. Peoples' expectations guide how they attend to information. They attend to some signs and symptoms and ignore others. What people expect from a treatment is indirectly related to the what other community members expect.

Whether or not people perceive a treatment as having *worked* (Young, A. 1976), depends on the expectations. For instance, a person drinks an herbal tea to stop a cough. The tea makes the person feel more comfortable, but the cough persists. The person considers the tea treatment to be a failure. On the other hand, if the caretaker only expected the tea to make the person feel better, they would consider it a success. In addition, different goals may require people to wait longer to evaluate them. For instance, people may only have to wait a short time to evaluate treatments that are designed to make a person feel better. They may have to wait a longer period of time to see if a treatment *cured* an illness (stopped the antecedent causes).

Regardless of whether the treatment worked or not, people make an evaluative judgment about the treatment's effectiveness. These judgments affect the current illness episode, the individual, and the community. If the medical problem remains unsolved, individuals treat the evaluation as new information and use it in subsequent parts of the management process. In addition, individuals learn from the experience and use the information in future decisions. The effect of any particular illness episode influencing peoples' overall evaluation of a treatment depends how much previous experience

individuals have had with the treatment. If they have had lots of experience, then this particular episode will probably have little effect.

For example, if an individual always uses the treatment for a particular illness (as in the case with scripts), the failure of the treatment will probably not affect future decisions. If, however, an individual has had little contact with this treatment, this particular experience will determine the treatment's overall evaluation. In addition, if the treatment is new to individuals, they will add it to their goal-derived categories, even if it is not successful. There is strong evidence that people base their choices on vivid first hand information rather than on aggregate information, even when aggregate information is more sound (see Kahneman et al. 1982 for review). As a result, people are more likely to consider their last experience with a particular illness rather than all their experiences.

To select sequential treatments, caretakers use strategies similar to those they used to select the first treatment. Depending on the type of previous decision, however, laypeople may only repeat some of the management stages they previously underwent. The more stages that people can skip, the more effort they save. If the first treatment fails to solve the problem, several management strategies are available. Laypeople can: a) select the next best treatment using the previous consideration set and inputs in selecting the first treatment; b) reevaluate the consideration set using different inputs; c) engage in a search for additional alternatives; d) rediagnose the illness; or e) change the original goal so it is consistent with the result of the first treatment tried.

Search for additional alternatives. The search for additional treatments most likely occurs when script-based health actions fail to work, or when all the previously

considered alternatives fail. At this point, caretakers may engage in more active searches for additional remedies.

Rediagnosis. People probably rediagnose illness quite frequently. Both healing specialists and laypeople rediagnose illnesses, but for different reasons. Medical specialists rediagnose illnesses as part of a hypothesis-testing strategy. For instance, the failure of a particular treatment may show a medial practitioner that his or her previous diagnosis of the illness was incorrect. In contrast, laypeople may rediagnose an illness because the new illness brings to mind alternative health actions. Rediagnosis is extremely flexible when people use past examples to categorize illnesses.

Relinquishing responsibility. Another option in the management process is to hand responsibility for the decision to someone else. Laypeople try one or two home remedies to see if they can cure the illness. When these remedies fail, they may ask others to take over the medical care. In pluralistic medical systems, people relinquish control to therapy management groups. In medical systems dominated by one medical tradition, they hand responsibility over to professional practitioners.

General Effects on the Home Care Management Process

Some determinants affect a particular stage of the management process more than others. For example, characteristics of the illness appear to affect the illness recognition and problem formulation stage more than any other portion. Caretaker characteristics, especially knowledge of treatment options and past experience, play a key role in generation of a consideration set, and the selection among alternatives. The characteristics of the treatment play an important role in the selection stage. Household

characteristics and the characteristics of a person's social networks affect all the stages of the process. What signs people recognize, and the options they consider are influenced by whom they know. Which options are selected will ultimately have to do with whether the household has the time and resources available.

The management process is extremely dynamic in that a caretaker can repeat stages as needed. In addition, the evaluation of illness severity, causality, and diagnosis is continually updated throughout the illness episode. Caretakers monitor changes in signs and symptoms from the beginning to the end of the episode. Additional signs or longer duration increase caretakers' assessments of illness severity. Such changes increase the impetus to act, reduce delay, increase the search for alternative health actions, and force people to consider previously rejected alternatives.

Caretakers also reevaluate their diagnosis and perceptions of causality based on changes in signs and symptoms, as well as on the success or failure of tried treatments. The initial diagnoses and attributions of causality may be different from the diagnoses and attributions of causality at the conclusion of the illness episode.

The constant updating of perceived severity, diagnosis, and causality make these concepts difficult to measure. Most studies ask informants to recall their perceptions of severity, diagnosis, and causality after the illness is over. This assumes that the severity, diagnosis, and causality reported at the end of the episode are the same as those that people held at the beginning of the episode. This is probably false.

Networks play two important roles: a) they provide access to resources (both material and informational); and b) they act as the mechanism by which social pressure is

brought to bear on individual choices. People have learned from other members of their group which signs and symptoms to recognize and how to diagnoses illnesses into one category or the other. Laypeople use the local explanatory model for recognizing and classifying illnesses. Which options are considered also depends on whom you know. People who have larger and more diverse networks know of more treatments. People who have more tightly woven networks know of fewer options and are more likely to have more social pressure brought to bear on the decisions they make. At the selection stage, networks influence what resources are available to obtain particular treatments. They also influence what treatment selections are justifiable in terms of group norms.

Discussion

I argue that at the individual level, *the decision-making process is the adaptive mechanism by which individuals respond to particular* illnesses. The process by which people select among alternative treatments is extremely dynamic. The decision-making process allows individuals to: a) consider factors in the natural and cultural environments; b) integrate both personal and group experience; c) react to the problem at hand; and d) learn (at the individual and group level) from the experience. The process is also extremely flexible. No one stage wholly determines the behavioral reaction. And the individual can give up control of the decision-making process at any point to either a more knowledgeable therapy management group, or a medical specialist.

A framework that focuses on the *process* by which people recognize, define, and select among alternative solutions is useful for examining the complexities

associated with care-seeking behavior. The framework that I offer integrates individual and group-level dynamics by considering what information catetakers use in choosing treatments and where the information comes from. It also accounts for how material, structural, and mental factors interact to influence treatment patterns. By framing care seeking as a quest to solve a problem, the decision-making perspective never loses sight of what it seeks to explain — treatment behavior.

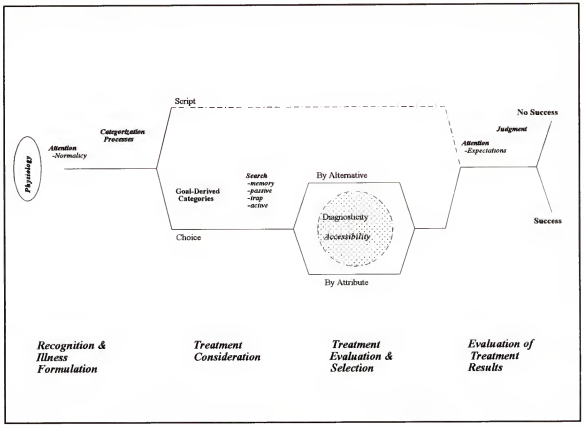

Figure C–1 Decision stages.

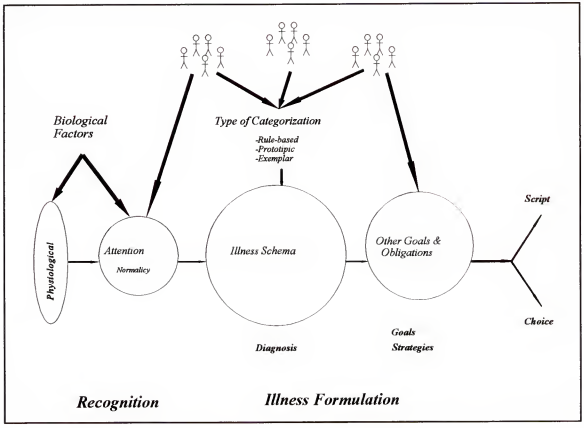

Figure C–2 Recognition and illness formulation.

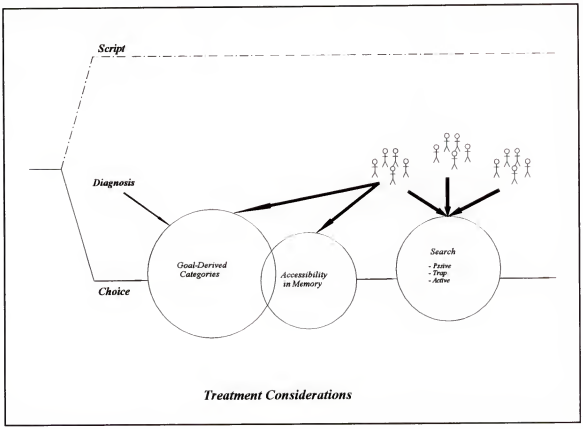

Figure C–3 Alternative consideration.

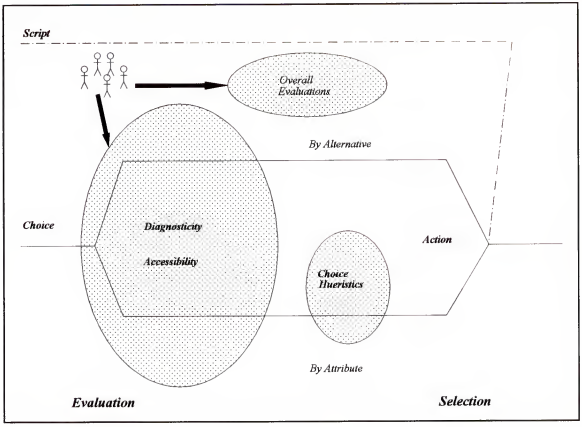

Figure C–4 Treatment evaluation/selection.

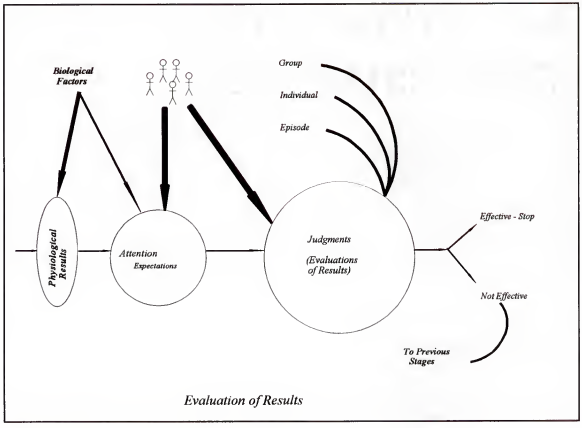

Figure C–5 Evaluation of treatment results.

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BIOGRAPHICAL SKETCH

Gery Ryan was born in Maine and has lived most of his life in Vermont. He attended Carleton College in Minnesota where he received his B.A. in anthropology and philosophy. His work on mothers' treatment of childhood diarrhea in a rural Mexican community led to his M.A. in anthropology from the University of Florida. The resulting paper, "Can we predict what mothers do? Modeling childhood diarrhea in rural Mexico" is in press at *Human Organization*.

Gery 's dissertation, "Medical decision making among the Kom of Cameroon: Modeling how characteristics of illnesses, patients, caretakers, and compounds affect treatment choice in a rural community," is a extension of his earlier work in Mexico. He continues to collect data in Mexico and Cameroon and is working on theories that account for differences and similarities across cultures in how laypeople manage illnesses. He wants to understand what causes different lay responses to similar diseases, and how these responses affect group care-seeking patterns. Ultimately, he hopes to apply these theories to health-care delivery programs in different cultures.

In addition to his interest in medical decision making, Gery has worked as a consultant to the World Health Organization, the Agency for International Development - BASICS, Center for Research on Women, and the Centers for Disease Control. He also has published articles on field methods in *Cultural Anthropology Methods Journal.* These

include: "Can Experts Systems Really Help Us Model Decisions in the Field?: Testing Artificial Intelligence on Infantile Diarrhea Management," "Working with Words in *WordPerfect*: Creating Special Characters for Exotic Orthographies," "Using *WordPerfect* Macros to Handle Fieldnotes I: Coding," and "Using Styles in WordPerfect as Templates for Your Field Notes."

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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